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FLIGHT

1938

The AIRCRAFT ENGINEER AND AIRSHIPS

No. 1552
Vol. XXXIV

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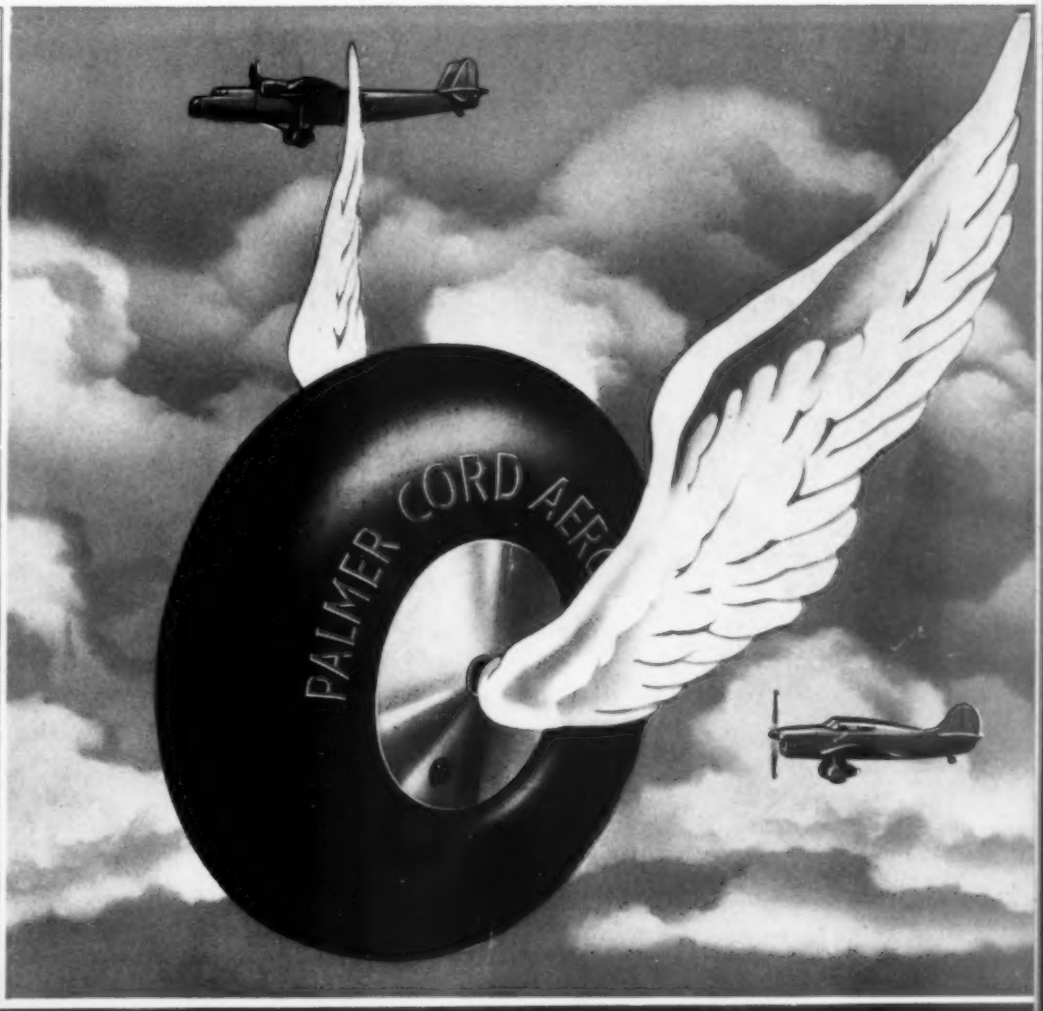

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

The Prime Minister's Flight

NEVER, perhaps, since the first flight of Orville Wright showed that heavier-than-air flying had arrived, has the speed of the aeroplane been of such beneficent use to mankind as in taking the British Prime Minister to visit the German Chancellor. We do not yet know how the political crisis may end, but there is at least a chance that the meeting of the two most powerful leaders in the old world may have averted war and so saved the lives of millions of human beings. Once the meeting had been proposed and accepted, speed in bringing it to pass was of the greatest importance. Political events were moving at a disastrous pace, and the dogs of war were straining at the leash. Peace might not have waited on the deliberate progress of train and steamer; the aeroplane came to the rescue.

If our hopes are fulfilled, and a peaceful settlement is the result of the conversations of Mr. Chamberlain and Herr Hitler, the air will have set up a large credit balance in saving life as an offset against the loss of life which it has caused in peace and war. Even the operations of flying doctors will pale before this deliverance from the wholesale slaughter which would be bound to follow a European war.

No Criterion

A CORRESPONDENT in this issue writes that, as Germans set great store by details, it was unfortunate that the Prime Minister should have used an aeroplane of foreign type instead of a British machine. With peace and war possibly hanging in the balance, such a point would naturally seem trivial to a British statesman. Of course, Mr. Chamberlain did not settle such details himself; one of his staff would make all the arrangements. The Lockheed Electra is a very fast machine and British Airways had one ready. Certain new British types of passenger aeroplane, which are even faster and much more commodious, are not yet ready to accept emergency orders. His Majesty's Airspeed Envoy has a top speed about the same as that of the Electra and a cruising speed scarcely less, but, though there can be no doubt that the King would have been willing to lend it, it may not have been available. The Air Council's D.H. 86 is not so fast. So the Electra was the best type to choose in the circumstances. We can hardly believe that the Germans would take its use as evidence that Britain has no good aircraft designers. At the moment people are thinking less of civil designs than of Air Force types, and all the Germans who matter know about the Blenheim, the Hurricane and the Spitfire.

Air Power in War

IF the worst should happen and war should break out in Europe, a curious military situation might develop. Neither France nor Russia has direct access to Czechoslovakia, while the fortified lines on both sides of the Franco-German frontier are considered very strong. The experiences of the last war would probably discourage general staffs from making frontal attacks on strongly prepared positions, and, if so, the armies would be immobilised until some solution of the problem could be found. As a result the value of the air arm would be greatly enhanced, and the opening stages of the campaign might be largely fought out in the air.

The last war ended before the aeroplane had developed its full power as an instrument of war—most probably it has not yet fully developed it—and consequently many problems concerning its use are still just problems. While the principles of strategy are eternal, each war in turn sheds new light on the tactical employment of the weapons of war, and the next war—may it be far off!—will doubtless provide an answer to many speculations on the use of aircraft. Air staffs are busy pondering these matters, and a good deal has been published on the subject, though the ordinary reader may not read very

much of it. On pages 246-250 of this issue our R.A.F. correspondent discusses some of the matters treated in those publications, and at the present moment of tension such a digest will, we believe, be of unusual interest.

A.T.L.A. and the Atlas

LAST Friday came into force the Air Navigation (Licensing of Public Transport) Order, 1938, and on that date also began the independent work of the Air Transport Licensing Authority, which was formed in June last, and which is composed of Mr. Trustram Eve, Sir Frederick Sykes and Mr. F. R. Davenport.

The official announcement concerning the A.T.L.A. will be found elsewhere in this issue. It will be observed that the powers of the trio are fairly extensive. If the Authority exercises its powers with discretion all may be well. At any rate, it can give its whole time to a study of the subject—and it will need to do so to some tune if anomalies are to be avoided and unnecessary competition kept down to a minimum.

That rapid decisions will be given is hardly to be expected. The Authority has the power to call for and consider information concerning the need for and possibilities of suggested routes. That in itself will take some time. Doubtless statistics are available which will serve as a guide, but the Authority will, nevertheless, have a difficult task in deciding between the rival claims of alternative routes. In the days before we had any commercial aviation, Sir Frederick Sykes was fond of calling Egypt the "Clapham Junction" of the Empire routes. He had his leg pulled on more than one occasion by Sir Sefton Brancker about his long view, but at least he was a man of vision. That characteristic may be assumed to be still his, and he will need it in passing Solomonic judgments in controversial cases.

Raising Objections

WHEN the Authority has examined a suggested route and its possibilities, it still has to make sure that the operating company which applies for permission to operate the route has sufficient financial resources, and has a satisfactory record of efficiency. What the yardstick is by which that efficiency is to be measured has not been laid down.

The decision to publish applications for licences so that local authorities, aerodrome owners, public departments and air transport companies may have an opportunity "for making representations and raising objections" (which may be followed by private or public hearings) opens up almost unlimited possibilities for causing delays. Competing firms will doubtless do their best to squash applications from rivals, and one can foresee quite an amount of washing of dirty linen.

Bearing in mind the difficulties with which the Authority may be faced, it was undoubtedly wise to decide to issue, at first, provisional licences of limited duration to companies which are already operating air routes. In that way interruption of useful existing services will be avoided. But the real fun will start when it comes to selecting new routes and the firms to operate them.

Scotland-South Africa

IF all goes well, *Mercury* will be well on its way towards South Africa when our readers open their copies of *Flight* this morning. The intention was that the start should be made from Dundee yesterday.

For the Scotland-South Africa flight the machine was loaded to a somewhat greater gross weight than the 20,800 lb. which represented its weight at the start of the Atlantic flight last July. No pay load was being carried, and extra fuel tanks had been installed, so that the ultimate range of the machine is very considerably in excess of the 3,000 miles of the Atlantic flight. The still-air range is thought to be sufficient to give reasonable hopes of beating not only the existing world's record for seaplanes but even the out-and-out distance record established by the Russian ANT-25 monoplane in July of last year.

On a flight of this length weather conditions play a very important part, and a following wind, even if it is not very strong, can add many hundreds of miles to the distance flown. Let us hope the fates will be kind to *Mercury*. The great-circle course will take it across the Sahara and then down the west coast of Africa. Once the coast has been reached the machine is more favourably placed than have been the landplanes which have established records, for its floats should enable it to be put down almost anywhere, either in the sea or on any available river. Thus it will be possible for the crew to carry on until nearly all the fuel has been consumed.

The present world's record for seaplanes was established by the German Do.18 Dornier flying boat which last March flew from Start Bay, Devon, to Caravellas, in Brazil, a distance of 5,214 miles as measured along the great-circle course. The machine did not follow this exactly, but travelled via Las Palmas, where it was duly observed, and so was credited also with the longer broken-line distance of 5,241 miles. The landplane record of the Russian crew stands at 6,306 miles. The distance from Dundee to the Cape is approximately 7,000, so that *Mercury* has plenty of room.

The Graf Zeppelin II

WARS and rumours of wars are a great nuisance to everybody, but more than usually so when the good of mankind demands that two nations should co-operate in some transport enterprise. Germany has the experience in airship operation, America has the helium which alone can make airship travel safe and useful. Obviously the two ought to work together. That they cannot do so at present is most unfortunate.

When the *Hindenburg* was destroyed by fire in Lakehurst the doom of the hydrogen airship was pronounced. The Americans at once undertook to let the Zeppelin company have helium for their next airship, which has now been named the *Graf Zeppelin II*. Helium can now be supplied at a reasonable price, and with increased demand the price would soon be down to something like a commercial level. Then the political position in Europe became disturbed, and America demanded a guarantee that if helium were supplied it would not be used for warlike purposes. We feel confident that Dr. Eckener would have given such a guarantee if it had been in his power, but in time of war he might not be able to keep his airship for peaceful use.

So the United States have refused to sell the helium, and rumours that German chemists had discovered a synthetic substitute have been shown to be incorrect. The *Graf Zeppelin II* is making her test flights with hydrogen, but with that inflammable gas in her cells she is of no practical use to transport. So the testing out of the commercial airship has been again postponed, which, from every point of view, is a matter for regret.

DIARY OF FORTHCOMING EVENTS—PAGE 265

HISTORIC DEPARTURE : The British Airways Lockheed Electra, carrying Mr. Chamberlain on his momentous mission to Herr Hitler, leaving Heston last Thursday. The Electra was piloted by Cdr. C. N. Pelly and Cdr. D. S. King. Another Electra, piloted by Cdr. E. G. L. Robinson, acted as escort

Six Miles a Minute !

DURING the early days of flying the art had to borrow from, and owed a good deal to, motoring. Nowadays the tables have been turned and the motor-racing fraternity comes to the aircraft industry not merely for ideas but for actual equipment. The Rolls-Royce and Napier aero engines enabled first Capt. Eyston, then Mr. John Cobb, and then Eyston again, to raise the world's land speed record to the almost fantastic figure at which it now stands, i.e., 357.5 m.p.h. Both concerns and both drivers deserve the thanks of the country for their magnificent performances. They have raised British prestige in a manner which will benefit both industries. To have averaged a speed of very nearly six miles a minute on land is a feat which demands the utmost from man and machine.

One has heard, during the last few days, remarks by non-technical people expressing surprise that the land speed record should now stand at a figure a good deal higher than the speed of the Hawker Hurricane fighter, for instance. Judging by surface appearances, this puzzlement is quite understandable. An aeroplane should be much faster, and the risk only exists for a very short period when taking off and landing.

The explanation, of course, is that, for one thing, the power of the two engines in the record-breaking car was considerably greater than that of the Hurricane's Merlin. And the car did not have to carry eight machine guns and their ammunition, nor did it carry fuel for hundreds of miles. If one wants a true comparison, it should be made between the speed of the car and the Macchi seaplane on which Francesco Agello averaged 441 m.p.h. in 1934. The engine powers of these two record-breakers are at least comparable and the difference in speeds represents the degree to which, power for power, the aeroplane is more efficient.

Flying Over Towns

ANOTHER civilian "third party," a woman, has lost her life through an aeroplane of the Royal Air Force falling on a house in a town, and the inhabitants of Stamford are reported to be petitioning the authorities to prevent the aeroplanes from Wittering from flying over their town.

It does not seem that the Air Ministry can do anything in the matter. It is impossible to forbid all aircraft from flying over a town. The rule is that a pilot when over a town must fly at such a height that, having regard to the gliding angle of his machine, he can get to open country if his engine fails. In this case the accident was the result of a collision in the air, and at the inquest it was suggested that it was due to the crews —who escaped by parachute—being unable to see one another. The risk of collisions must increase with the expansion of the R.A.F., and stricter circuit rules may be desirable, especially during the emergency period when, as sometimes happens, squadrons and an F.T.S. are using the same aerodrome.

WHAT O

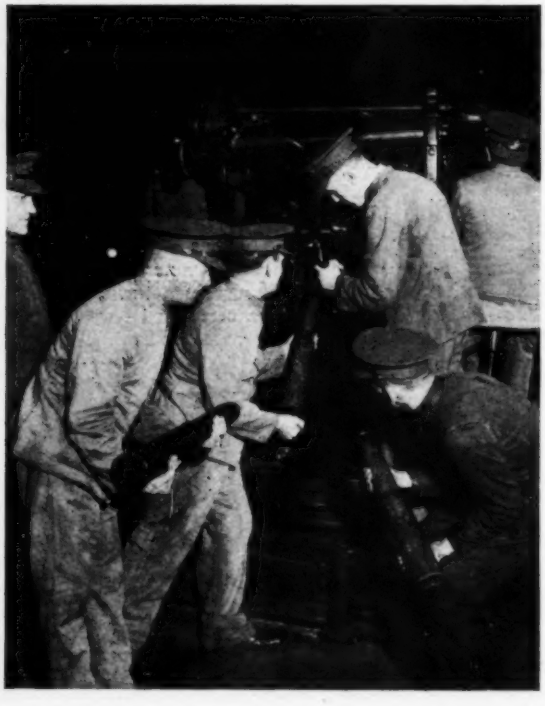
Our defence: Four elements are illustrated on these two pages — fighters, as represented by the Hawker Hurricane (left) and the Supermarine Spitfire; the barrage balloon; and anti-aircraft guns and searchlights.

"Flight" photographs.

THE crisis of the past weeks has turned the thoughts of millions to the problems and uncertainties of air power. South of the Baltic there is hardly a city in Europe which has not been anxiously pondering the matter, for once war has broken out its limits cannot be foretold. The report that Germany had earmarked 1,500 aeroplanes for use against Great Britain in the event of war was enough to make our people feel grave. On the other hand, the German cities in the Rhineland had a taste of the operations of the Independent Air Force in 1918, and surely could have no desire for a repetition of the experience. Apart from the chance of air raids on cities, there is the wider question of how far air power can affect the results of a war.

In examining this question we should first lay on one side the reconnaissance aeroplane. It will always be useful, whether by sea or by land; but it is not a factor in air power. It is an invaluable ancillary of fleets and armies, bringing information to their staffs and directing the fire of their guns. However opinions may vary about air power, the reconnaissance aeroplane will always hold its place in warlike operations.

In most countries there is what may be called an extreme air school of thought which believes that aircraft will be the deciding factor in modern war. It believes that the bomber aeroplane will prove itself more potent than either fleets or armies. Let us therefore examine the powers and functions of the bomber.

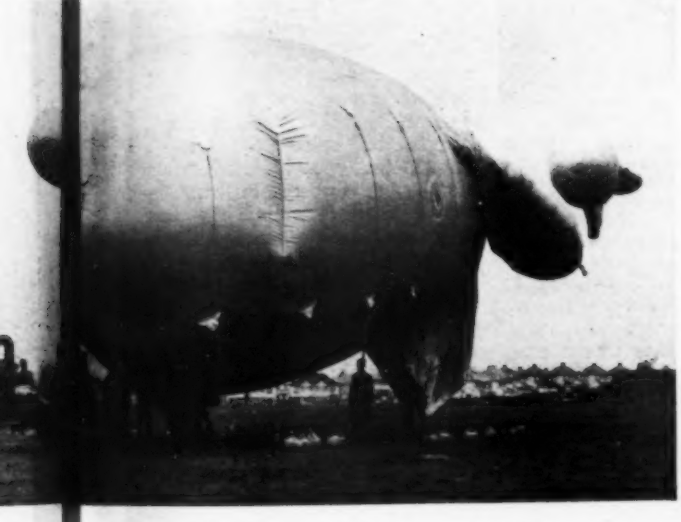


There are two ways in which the bomber can be used: (1) As long-range artillery to attack military objectives, and (2) to terrorise a civil population into demanding that its Government shall sue for peace. It is, of course, possible that the efforts of a bombing force may be divided between these two methods, but in that case neither will be carried out with the greatest possible effect. Strategy demands concentration of effort, not dispersal. One section of the extreme air school believes in the efficacy of attacks on cities. It takes as its text a saying of the late Marshal Foch to the effect that it might be possible to strike behind the armies and break the enemy people's will to resist. One very much wonders whether that great commander, if he were alive now, would repeat his dictum. History provides no notable example of a virile people being driven to surrender by "frightfulness," and all the evidence from the recent fighting in Spain and China points in the other direction. Atrocities on a civil population rather stiffen resistance and generate indignation. Moreover, once a war has broken out, it cannot be said that the people rule their Government, even in a democratic country, still less in a dictatorial one. Provided that the armed forces of the country are more than holding their own it is hardly conceivable that any Government would sacrifice its advantage and sue for peace in response to demands from the people of one or even several cities. Once the people as a whole have given their approbation to the

the AIR MENACE?

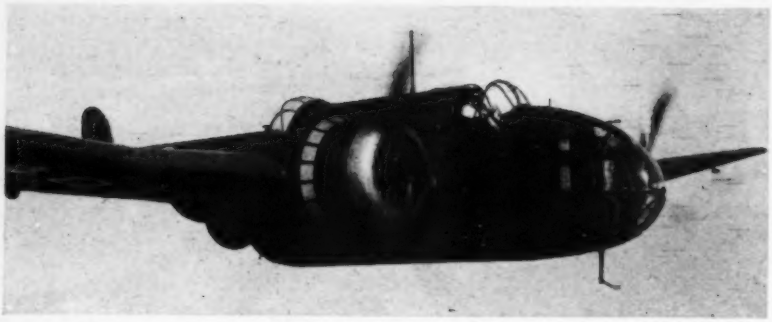
Potentialities of Attack and Defence Examined in the Light of the Present Situation

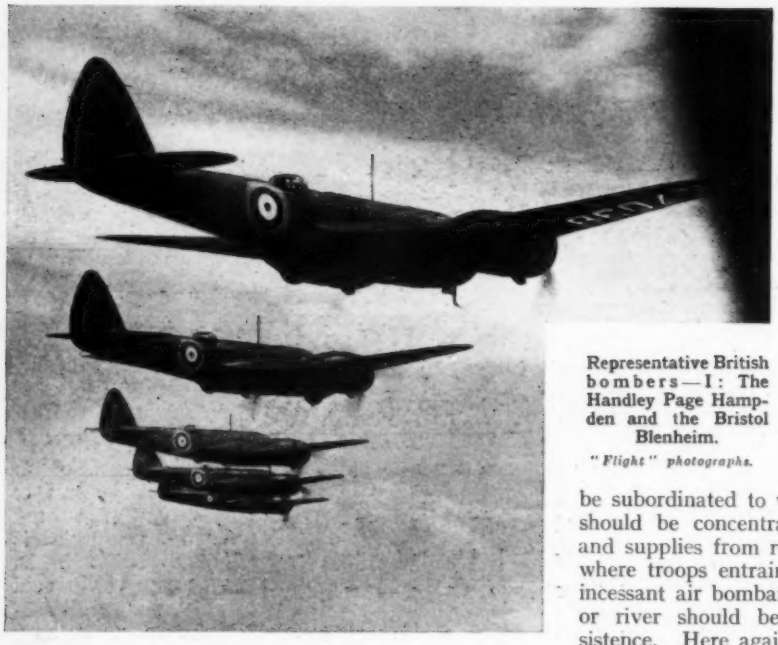
By Major F. A. de V. ROBERTSON, V.D.



declaration of war, the Government of every country becomes more or less autocratic. It will only be driven to surrender by the defeat of its armed forces or by its inability to provision the population and to supply the forces. That can come about as the result of some form of blockade. In the last war the German submarine blockade nearly brought Britain to the end of its food supplies, while the British naval blockade did actually result in depriving the German armies of the means to resist any longer. The result was the defeat of the German armies in the field and the acceptance by the German Government of terms which meant absolute and complete surrender. Air raids on cities could never produce such a result.

Madrid, Valencia and Barcelona were never forced into surrender by air raids, even when they had practically no air defences. A city which has strong defences and is practised in air raid precautions is in far less jeopardy. The extreme air school professes to discount all air defences, and Lord Baldwin was once duped by this school into uttering the ill-considered remark that "the bomber always gets through." Nobody has ever pretended that it is possible to prevent every bomber from getting through, but it is certainly possible so to reduce the bombers' success that, practically, the enemy's bombing effort will be defeated. Bombing raids on cities need not all be efforts at intimidating the civil population by slaughter; in many cities there are targets of military importance which it is quite legitimate for the enemy to try to destroy. When making these legitimate raids the weapon used would be the high-explosive bomb, whereas attempts at slaughter might be made, despite agreements to the contrary,





Representative British bombers—I: The Handley Page Hampden and the Bristol Blenheim.

"Flight" photographs.

with mustard gas and incendiary bombs. If the high-explosive bomb, aimed at a munition factory, for example, misses its aim, then, although it may kill some civilians in the neighbourhood, that raid is a failure.

Now a bombing raid is rather a big undertaking. Expense may not matter much in time of war, but still the bombers are costly and their trained crews are even more valuable to their country. On a raid the crews have to make a big effort and run a great risk. The high command naturally hopes for some useful result from the effort and risk, something which will have an effect on the course of the war and make some contribution to victory. The destruction of the munition factory would have been a satisfying result, but the killing of some civilians will have no effect at all in helping to win the war. It follows that if the defence can prevent a substantial majority of raids from hitting their targets, the enemy's bombing effort is not going to prove the decisive factor in achieving victory.

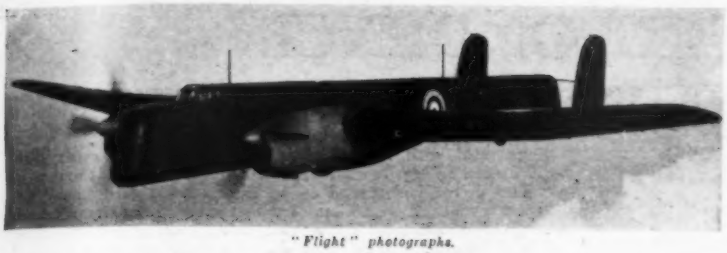
It we take it that bombers will be employed entirely for attacking military objectives, certain principles for their use have been deduced from the experiences of the last war. They may be employed (1) in attacking the front line, (2) in attacking the enemy's distribution of munitions, i.e., on the lines of communication, and (3) in attacking the enemy's production, such as ammunition factories. Bombers, and other types of aircraft, too, have been much used in Spain for bombarding the enemy's fighting positions, probably because artillery was lacking or had not been brought into position in time. Aircraft are certainly more mobile than guns, though the general opinion is that bombing is not so accurate as shelling. In some of the Spanish battles the aircraft bombardment is said to have had great moral effect on the troops holding the positions, though the material damage which they did was not considerable. Unless one is obliged by circumstances, it is certainly bad tactics to use aircraft to do work which guns could do better. Aircraft ought to be reserved for work which no other weapon can undertake. It is likewise wasteful to use fighters to assail infantry, as it leaves the air unprotected against enemy aircraft.

Munition production or distribution centres are very proper objectives for bombers, because the guns cannot reach the former at all or the latter to any great extent. The choice between these two objectives depends on the military situation at the moment. When the armies are on the move, the enemy's movements should be hampered by bombing his lines of communication and his transport. When a battle is in progress, everything else must be subordinated to winning that battle. The bombers should be concentrated on preventing reinforcements and supplies from reaching the firing line. Railheads where troops entrain or detrain should be kept under incessant air bombardment, and bridges on rail, road, or river should be destroyed with the utmost persistence. Here again the principle of concentration of effort must be applied. Repairs to the damaged railways and roads must not be permitted; a line once cut must be kept out of action. During the battle all thoughts of diverting energies against enemy production must be abandoned. It is no use to arrange for the enemy's defeat next month if he wins the battle to-day.

In the intervals between battles, production is the most suitable subject for the bomber's attention, and again targets should be selected on a definite tactical plan. Slight damage to a great number of factories is much less effective than the complete destruction of a smaller number of important ones. The only reason for departing from this principle would be to put the nerves of the factory workers on edge in as many places as possible, but that helps the bomber's country less than does the complete destruction of a number of important factories—destruction, that is, beyond the hope of repair in any reasonable length of time.

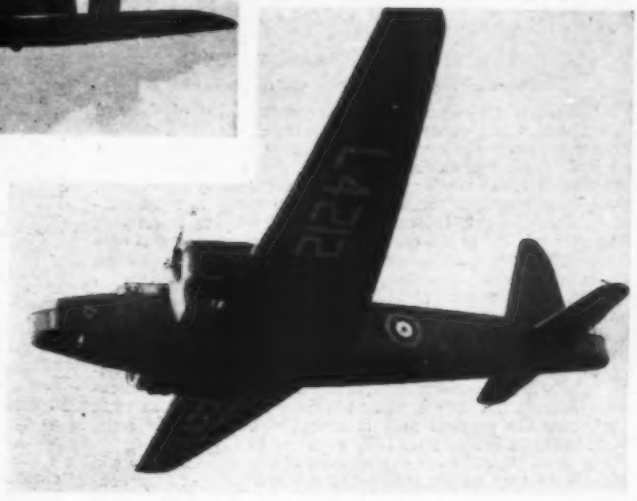
Limitations of the Bomber

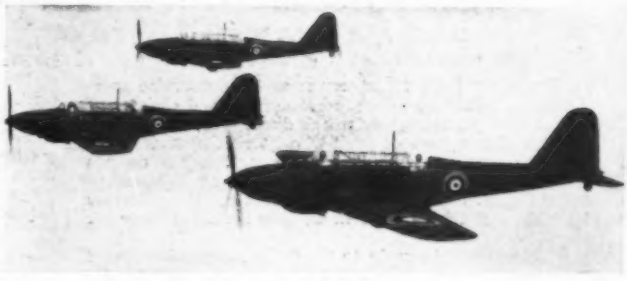
As Great Britain stands to suffer more than most countries from the success of a bombing campaign, it is satisfactory to reflect that the bomber's task is not an easy one. Its requirements in the way of weather are rather exacting. From some unfortunate experiences of our own during air exercises, we know that in thick weather the bomber runs risks. On the other hand, it does not appreciate very clear weather, either by day or by night, for such conditions make the task of the



"Flight" photographs.

Representative British bombers—II: (Top to bottom): A.W. Whitley, Vickers Wellington and Fairey Battle.





fighters and the guns most easy. The bomber likes clouds to conceal him on his flights to the target and away again, but the target itself must be clearly visible if he is to make good bombing practice. Such ideal conditions do not occur very often, even in Great Britain. Moreover, a veil of clouds below him will not prevent the whereabouts of the bomber from being discovered by our latest sound-locators. When aiming his bombs, the bomber must fly, if even for only a brief period, on a straight and level course. The defence will be waiting for that moment, and either guns or fighters will be ready for it. The guns can make very good shooting when the bomber flies straight and level.

Low-flying raids would present the most difficult problem to the guns and fighters, but the balloon barrage ought to be able to deter enemy pilots from such tactics. When our eight-gun fighters intercept a raid, the odds should all be on the defence, and particularly at night if the bomber is caught in the beam of a searchlight. Interception has been our greatest problem in air exercises, for no reports were received until the raids had crossed the coast, and then it took them very few minutes to reach London. With France as our ally, that difficulty would be enormously reduced, for most raids would be reported at a much earlier stage. It does not take very long for our Fighter Command to throw a fighter patrol in the way of a raid, and a few more minutes' warning make a lot of difference to the chances of interception.

Alliance with France also makes a huge difference to the effectiveness of our bombers, for "our frontier is the Rhine," as Lord Baldwin said in one of his happier moments. Our machines starting with full tanks from an aerodrome in France will have a very useful sphere of action. In 1918 the Vickers Vimy was designed to be able to bomb Berlin; our machines now have a very much greater range. We may be sure, however, that British bombers will not be used for attacks on civilian populations. Even apart from humanitarian grounds, which always make a very strong appeal to British people, we shall use our bombers to better effect by attacking military objectives. The wise commander aims always at winning the war, not at making himself spitefully unpleasant to the enemy people.

"MERCURY'S" GREAT ATTEMPT

THE upper component of the Short-Mayo composite aircraft will by now, all being well, have left Dundee on its long-distance flight to South Africa. Neither Short Brothers nor Imperial Airways have announced any intention of attempting to beat the world's record, but it may safely be assumed that such a possibility has been kept in mind.

For the flight *Mercury* has been fitted with extra fuel tanks which increase the capacity from the normal 1,180 gallons to 2,130 gallons. It is estimated that by flying carefully in accordance with curves and tables specially prepared by the Short technical staff, the still-air range of *Mercury* should be about 6,700 miles. This would be enough to beat by a substantial margin the Russian record of 6,306 miles.

For the long-range flight *Mercury* was loaded to a gross weight of approximately 27,500 lb. instead of the 20,800 lb. weight at the beginning of the Atlantic flight. Separation must obviously take place at a greater speed to compensate for the greater weight, but both components are well capable of sustaining the extra loads. It was the intention to separate at about 6,000 ft. No other long-distance flight has had the advantage of beginning its flight at such a height, and one result is that the harrowing hours immediately following the start are avoided. With a wing loading of some 45 lb./sq. ft. the advantages of starting the flight at a good height are obvious. The pilot can remain at that height or climb very slowly for the first few hours.

Mercury is piloted by Capt. Bennett, of Imperial Airways, but instead of the wireless operator carried on the Atlantic flight he is accompanied by a second pilot, First Officer I. Harvey, who had long experience as a wireless operator before he became a pilot. The lower component, *Maia*, was again piloted by Capt. Wilcockson.

Dotting the European Map

THE Finnish Communications Department is to spend 2.6 million Finnish marks on aerodromes. Half a million will be spent on extensions at the Helsinki Airport and nearly 1½ million on the construction of new aerodromes at Tammerfors, Vasa and Uleaborg.

Already under construction is an aerodrome measuring 900 by 9,000 metres at Kalnciema Iela, on the outskirts of the Latvian capital, Riga. It is primarily intended for private flying, which will in future be entirely banned from Riga's commercial airport at Spilve.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

THE EDMONTON ACCIDENT

Elastic Interpretation of a Rule

ALTHOUGH no one will wish to be reminded of the sad accident which occurred at Edmonton so recently, in view of the general impression gathered from reports of the inquest that Sgt. Morris had disobeyed several rules, I feel that certain facts should be recalled. The very sensible orders governing height over populated areas need no comment, but the suggestion that the rule limiting so-called local flying to an area within three miles of the aerodrome boundary was in this case deliberately broken seems most unjust. In flying, rules must usually be most strictly obeyed; this three-mile area rule is, however, one which is regularly disregarded.

At an aerodrome such as Hatfield, where at week-ends up to 40 Reservist machines, ten or more London club machines, private owners, De Havilland experimental types, and visitors may all be in the air together, it would often be most inadvisable to practise even normal turns within five miles of the aerodrome boundaries. I am sure it will be agreed that at most aerodromes the practice area is stretched to about ten miles and that the authorities are fully aware of this.

It is to be hoped that some revision of this obsolete rule will be made so that unfair judgments will not be made by non-flying folk to whom the real facts are unknown.

London, N.W. PILOT.

R.A.F. AGE LIMITS

The "Good Stock" of 1906-1909

WHY is the age limit for observers and short-service commissions limited to 25? Surely we had good stock born in the years 1906-7-8-1909 prior to the disturbances of the war—young men with a dash of devil who go risking their necks on speedways, grass tracks, scrambles and trials courses during the week-ends and who would jump at an opportunity to join the R.A.F. to fly. At least raise the age for observers to 32 and then, if they are worth it, give them a chance for full wings.

I have noticed that the reply to the R.A.F. expansion appeal is very low; ten observers in one week! H. WILLIAMS.

Leeds.

THE "ROYAL AND ANCIENT"

—Society is Represented on One Committee

I AM writing to offer my apologies for an error in my recent letter to you on the subject of the Royal Aeronautical Society. It has been brought to my notice that the society really *is* represented on one government committee—that which directs the policy of the Science Museum at South Kensington.

While it is doubtless appropriate that the oldest aeronautical society in the world should be associated in this intimate manner with a museum, it should not be forgotten that age does not necessarily imply senility. Those who know the society and its membership will realise that the work its representatives could do on committees dealing with current aeronautical problems would be invaluable. Why are they not invited to serve? W. O. MANNING.

London, W.1.

ESPERANTO AND AVIATION

Reply to a Criticism

I HESITATE to write yet again to *Flight* on a subject not directly connected with aviation. Some comment is called for, however, in reply to "A New Yorker" (page 227, September 15). To quote from his letter: "The more foreigners able to read and write your language the better for your propaganda and commerce."

Just so; this is the very reason why national jealousies and prestige have never accepted a national language for universal use. Only a neutral tongue such as Esperanto has a chance of acceptance as everybody's second language.

As regards schemes for simplifying English, there is no reason to suppose that any new idea will succeed where "Anglic," "Basic English," and many other proposals have failed. Reformed spelling is laughed at by the English public. Our spelling and pronunciation are very difficult. As a literary language English leads the world, but for everyday speech—which is what concerns aviation—the carefully thought out Esperanto, with its five clear vowels and its 100 per cent. phonetic spelling, is more suitable than any national language.

Lastly, the widespread use of Esperanto is an accomplished fact; 1,600 Esperantists from thirty different countries assembled in London during August for their 31st Annual Congress. Speaking from wide experience in many countries, I maintain that poor Esperanto is far easier to understand than broken English—which is a matter of vital importance for radio telephony. F. H. TURNER.

Rochester.

THE PREMIER'S JOURNEY

—and the Aeroplane in which it was Made

IT seems rather unfortunate that a British aeroplane was not used to convey the Prime Minister on his momentous mission. No doubt it is only a finical consideration to the average Englishman, but to those who are engaged in the British aircraft industry the mere fact that his safety rested on the reliability of American engines powering an American machine must raise a sense of shame and damaged prestige.

The normal German is thorough in details, with which characteristic is embodied, in many cases, a technical outlook. In view of the fact that the make of the aeroplane was given full publicity, such a flagrant misuse of available choice could not fail to produce an impression from which some very natural conclusions might be drawn.

It was a high compliment to American engineering, which is fully deserved, but it would have been in no way disparaging to the American aircraft industry if a home product had been used.

I only mention this because it appears that we are not so eager to take every opportunity of upholding our engineering prestige as are, say, the Germans, on an occasion that truly warrants the best exhibition of all capabilities. R. TOWERS.

Coventry.

[Comment on this letter appears on p. 243.—ED.]

THIS PERSONAL INSURANCE

Assessing Risks

BEING insurance-minded, I have perused with considerable interest Mr. S. F. Lydon's letter in your issue of September 8, which to my way of thinking conveys a great deal of essential information on the mysteries of aviation personal insurance.

For one who is forced to travel a great deal by air it should prove to be a reminder of the service which insurance companies have to offer.

Only when we are faced with the premium of £7 per £1,000 for travelling by the regular recognised air routes, bearing in mind the present safety of such craft, do we have cause to grumble But to take a broad view, insurance companies are not philanthropic societies and they, like ourselves, are still very much in the dark as to the hazards they have to cover when fixing the odds.

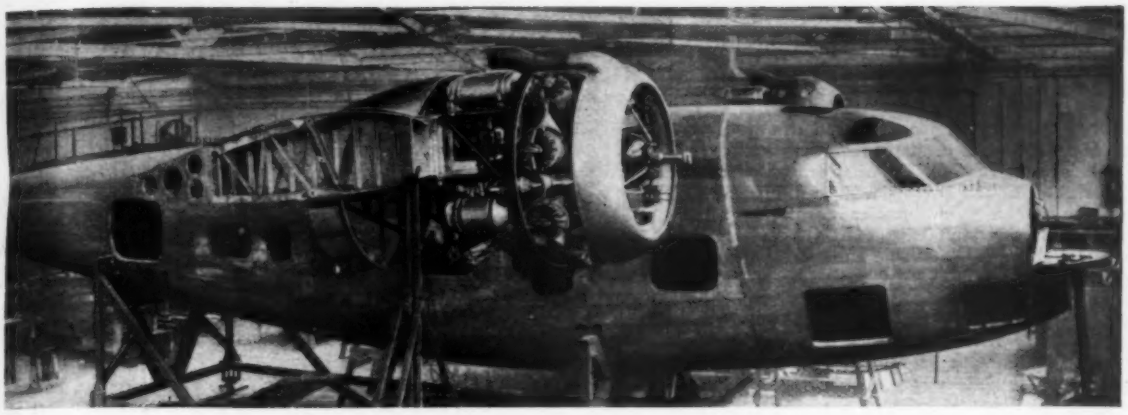
I have no doubt when air travel is extensively used for commercial travelling, premiums are bound to be reduced as insurance companies will have a wider experience on which to base their rates.

Everyone knows that any commodity in its experimental stage is rather expensive to procure.

Like "Indicator" I am not a mathematician, so cannot quote the odds, but I am more inclined to agree with Mr. Lydon's remarks when it is borne in mind that insurance is run on the lines of "one for all" and "all for one." To return to "Indicator's" comments at the foot of Mr. Lydon's letter: "Indicator" says, "After five years of accident-free flying I have paid £35 while the insurance company is still only risking £1,000." Let us assume, for example, that the insurance company has fifty such policy-holders as "Indicator" on its books; they would receive £1,750 in premiums during five years in the event of no claim arising, or insufficient to pay 1¾ fatal claims at the end of that period. On the other hand, supposing disaster overtook, say, three of the policy-holders during this period, the company would have to call on their reserve fund for something like £1,500 to cover a deficit between premiums received and the claims paid.

Surely, if "Indicator" was in the position of the company he would require an equitable premium sufficient to leave a

(*Concluded at foot of p.* 252.)



The fuselage of the D.H.95 is of stressed-skin construction. The nose, with flying controls, etc., is a separate unit. The gills of the controlled cooling system are placed much farther aft of the Bristol Perseus engines than usual.

HATFIELD LOOKS AHEAD

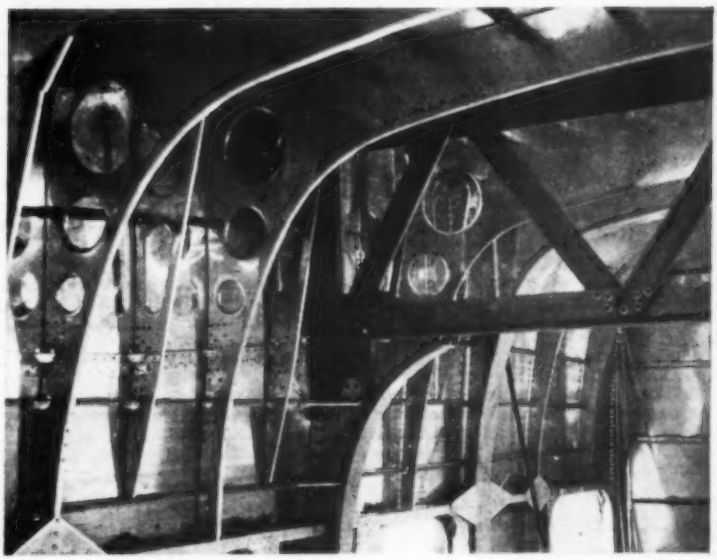
How the All-metal, Perseus-engined D.H. 95 is Progressing

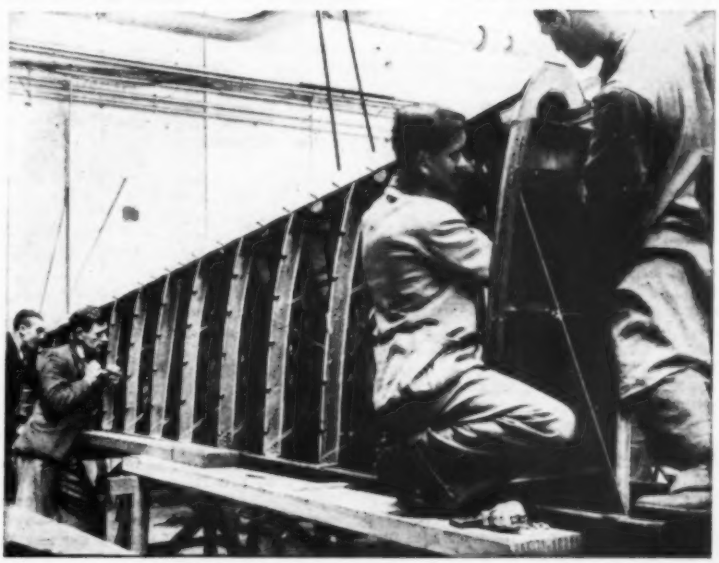
Illustrated with "Flight" photographs

WHEN an aircraft firm the name of which has always been closely associated with wooden construction turns to metal, the result is bound to be watched with interest. Although the De Havilland Aircraft Co., Ltd., has, of course, done a great deal of metal construction in the form of tubular girder fuselages, the firm has shown a decided preference for wood, and can be said to have brought wooden construction to a high degree of perfection.

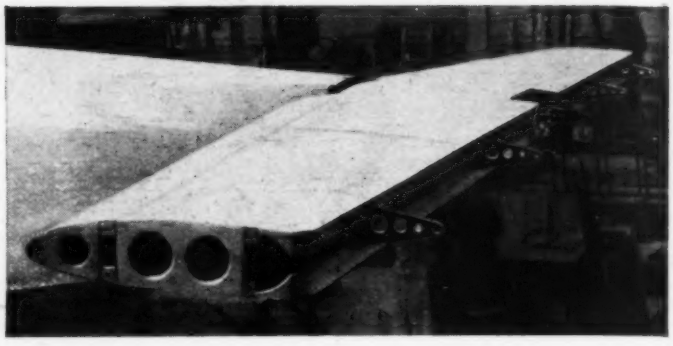
The time may come when improved and compressed wood will go a long way towards replacing metal, at least in certain classes of aircraft and for certain structural components. Until then, however, "the metal age" will continue its present popularity, and the famous Hatfield firm has not hesitated to branch out by laying down plant for the production of all-metal aeroplanes to proceed parallel with the continued wooden construction of existing and new types.

For the first effort in all-metal construction the D.H.95 was selected, and this machine is now taking shape in the new section of the Hatfield factory. Let it be said at once that the workmanship would not disgrace a firm with many years' experience in stressed-skin construction. For a first attempt it is remarkably good. Although entirely up to date, the particular forms of construction





The upper picture on the right shows the attachment of the main and auxiliary wing spars, which pass through the fuselage. The centre-section of the wing can be removed by undoing a few bolts. The outer wing portion, shown in the lower photograph, has a single spar and stressed-skin torsion box. The notches in the wing ribs are for the extruded stringers of the skin.



The tail of the D.H.95 is a pure cantilever, and the elevator is carried on set-back hinges. The rudders are bolted to the outer ends of the tailplane.

chosen are very simple, and one can trace in them the influence of many years' experience in wooden construction. A detailed illustrated description of the D.H.95 will be published at a later date, but in the meantime it may be said that the simplicity of the structure is largely due to extensive use of extruded sections.

In a general way the D.H.95 may be said to be the result of looking ahead at the requirements likely to obtain during the next three or four years. The machine is in the medium-size class, which is to say of a gross weight in the 14,000 lb. neighbourhood and with a disposable load of approximately 5,000 lb. According to the range required, that means a passenger capacity of from 12 to 18 and a crew of three. The machine is a high-wing monoplane with flaps and retractable undercarriage, and power is provided by two Bristol Perseus XIIC sleeve-valve engines of 850 h.p. each.

Some surprise may, perhaps, be caused by the choice of two engines, the modern tendency being, apparently, towards four. The number of engines is mainly decided by the excess of power, and, as the machine is of the high-performance type (the cruising speed is expected to be in excess of 200 m.p.h.), the power loading must in any case be fairly low. The D.H.95 will, it is calculated, have a sea-level rate of climb of more than 1,500ft./min., and will have a fairly high ceiling with one engine out of action. That, of course, is merely another way of saying that in the unlikely event of an engine stoppage immediately after the take-off, it will, with the undercarriage retracted, have quite a good rate of climb on one engine. And the undercarriage has been designed to retract in seven seconds. From the operator's point of view there is, of course, a good deal to be said in favour of two engines instead of four. The initial cost is likely to be considerably lower, and engine maintenance is greatly simplified, to mention but two aspects.

A large batch of 95s is being laid down, and with its high performance and modern features the machine should find a number of applications not only on internal air routes at home but in many parts of the British Empire, where the all-metal construction should appeal to operators.

CORRESPONDENCE

(Concluded from page 250)

balance to build up a reserve against the possible contingent liability above.

It seems fairly obvious that he has had a cover of £5,000 for £35 expended, and I feel sure that if disaster had unfortunately overtaken him his dependents would most definitely agree it was the finest bargain he had ever made.

To sum up, as "Indicator" cannot appreciate the profession of insurers it can only remain for him to look down (?) with posthumous pleasure upon his dependents' relief at his commendable forethought. WILLIAM H. MILLS.

London, S.E.23.

A C.A.G. Premium Increased : Flying and Existing Insurance

WITH reference to my letters in your issues of September 8 and 15, I have just learned that the company whose extra premiums for flying risks I quoted has decided to increase their extra premium for insurances effected after to-day (September 16) in respect of members of the Civil Air Guard from 10s. per cent. to £1 per cent. for whole life and endowment insurances, but has reduced the maximum term over which such extra premium would be payable from ten years to five years.

This increased extra premium, however, would be reduced for endowment assurances of less than 30 years on the same proportionate basis as illustrated in my letter in your issue of September 15.

As regards the point raised by your correspondent in this latter issue regarding existing insurances, I would point out that the conditions for life insurance vary with the different insurance companies. If at the time of effecting an insurance there had been no intention of engaging in aviation, a large number of companies would hold the person covered for aviation risks should flying be taken up at a later date, and would also cover the insured against war risks whether caused by flying or otherwise.

This practice is not, however, universal, and it would be very advisable for any of your readers who are not sure of the position under their policies to communicate with their insurance companies and get confirmation that they are fully covered.

My remarks that an insured could probably cease paying premiums and take a reduced sum insured were only meant to apply in the case of a company who refused to include aviation risks under their policy or required an unreasonable extra premium for doing so. S. F. LYDON.

London, E.C.4.

C.A.G. CORNER

"A Scheme Worthy of Applause and Not Groans"

REFERRING to "A pilot's" correspondence, I claim to have made a complete answer to his question as to "whether the C.A.G. will be worth it." But since he now says it is his intention to join the C.A.G. himself, may I please wish him all the best through the medium of your valuable paper—if in joining he is prompted, not only by the joy he gets out of flying, but also by his desire to fulfil, if required, the services for which the scheme is designed?

Competition amongst the masses is going to produce an abundance of skilled pilots. It will promote aircraft production ; encourage the development of new ideas ; accelerate better facilities for competent aviators ; and the flying clubs will progress with the expansion of membership. All this is inevitable, for is it not established that the greater the body the greater is the demand for consideration? The instigators of the C.A.G. have, in opening the sky to Tom, Dick and Harry, instituted a scheme worthy of applause and not groans.

London, N.10. C.A.G. CANDIDATE.

Willing to Serve

HOW sorry Mr. James G. Arrow (Correspondence, September 8) seems for himself because of his anticipated suffering through the formation of the C.A.G. ! But if he gets lost in the crowd what does it matter? Competition will produce quantities of efficient pilots, and those with the right incentive.

"Member No. 50 of the C.A.S.C." also seems a little disturbed as to how his flying is going to fare. He calls the C.A.G. aspirants "something for nothing" people. How very ungenerous of him, since the response is due to an urgent need of the State.

He asks why 40 per cent. of the C.A.G. applicants who could have flown previously had they had the necessary interest wish to fly now? The answer to that, obviously, is that their interest has been roused because their services are now desired ; and who can say at the moment that they are not in for a very definite spot of serious business?

London, N.10. R. R. WHITTARD.

COMMERCIAL AVIATION

NON-STOP "FOURTEEN": British Airways' Lockheed 14, which, as related on the next page, flew from Heston to Stockholm and back last Sunday, having made the 905-mile journey non-stop each way. On the outward trip she averaged 212 m.p.h.

THE WEEK AT CROYDON

"A. Viator" Returns—and in Righteously Critical Mood

THE really quite incredible way in which some branches of civil aviation are handled at the Air Ministry was aptly illustrated last week by an incident which is now the talk of the whole airport.

It seems that the Croydon Borough authorities were in search of a water supply, and found what they wanted at the very highest point of ground on the top of Purley Way, in an almost direct line with the radio beacon path. They proposed to erect an 84ft. derrick there and keep it in position about four months; the work was to commence almost at once.

The site and the time of year were obviously the worst possible, and the danger to aircraft would have been such as to make airline operation almost impossible in winter.

The least we might have expected from the Air Ministry was a refusal to allow anything so dangerous. What they actually did, it appears, was to grumble a little about further obstructions round the airport and give the Croydon Borough Engineer permission to go ahead.

The Ministry did not attempt to consult those most nearly concerned with this lethal device of a derrick, 176ft., no less, above the level of the landing area. The department only asked for time to get out one of its dear little pink *Notices to Airmen*, warning flying people that a powerful engine of destruction, appropriately lit with a pink fairy lamp, would be placed on the beacon path.

Only by accident and at the last moment before the work was due to start, only when the Borough Engineer had all his plans cut and dried, and only after the contractor had his materials on the site—only then were the Air Ministry officials at Croydon made aware of the matter.

The companies then heard of it, and a hurried meeting was held with the Corporation officials. The latter were extremely helpful, for despite Air Ministry permission and without special flying knowledge, they could see at a glance that the scheme was appallingly dangerous; indeed, they had been puzzled from the start by the easy way in which their path had been smoothed.

Half-an-hour's talk between two lots of practical people, the Croydon Engineer and the firm's representatives, led to a readjustment of the scheme, a resiting of the derrick at a less dangerous place, and the lowering of it to minimum possible height.

Everybody who attended the meeting (and some eight or ten air transport concerns were represented) was loud in praise of the reasonable and self-sacrificing attitude of the Croydon officials and of the contractor.

Now, if the Air Ministry department which gave the permission, and seemingly did not propose to consult anybody, had realised the immense and obvious danger involved, could that permission have been so lightly granted?

This would really appear to be a case for personal investigation by our energetic Secretary of State for Air, because it is the third time a similar nightmare state of affairs has arisen. The first pylon built remained *in situ*, despite strong representations from the air traffic companies, until a machine was destroyed by it and lives were lost. The second, which had no value to anyone, but cost a lot, was erected and had to be hurriedly lowered owing to protests from the companies. This third time, if those concerned at the Ministry had had their way, the thing would have been erected before anyone had time to do anything about it.

Comings and Goings

The international situation, curiously enough, affected the very international airport of Croydon hardly at all. Airliners of all nations gathered amicably on the tarmac, and pilots and personnel of the various companies rubbed shoulders with their accustomed geniality. Only passengers from big cities where folk get all of a twitter disturbed the peace of the airport.

The Prime Minister, thanks to the organisation of British Airways at Heston, was able to spare the time to leave England and visit Herr Hitler. Lord Runciman, thanks to air transport, was able to nip across from Prague in a matter of hours, and again, the French Prime Minister and his colleagues were able to leave their country by Air France and reach Croydon in an hour or so on Sunday morning, where they were met by Mr. Neville Chamberlain. The aeroplane may be an awkward customer in war, but look what it has done in the last few days in the cause of peace!

The hatless courier from the Czechoslovak Legation, who caused some stir by arriving with a large sealed envelope at 10, Downing Street when the British and French Ministers were in session there on Sunday, had received the envelope from a courier who came across from Prague by K.L.M./C.L.S. service the same day.

A. VIATOR.

COMMERCIAL AVIATION (CONTINUED)

Mutual Agreement

IN return for the right to operate a service between Prague and Riga, Polish LOT have obtained permission to operate a non-stop service between Warsaw and Budapest and crossing Czechoslovakia.

Empire Service Duplication

IMPERIAL AIRWAYS announce that so heavy are passenger bookings and freight consignments, the services on the India-Australia route on the next two Sundays are being duplicated.

The duplicate service on September 25 will go as far as Karachi and that on October 2 as far as Basrah. Thereafter lightened loads will permit the operation of the normal service.

These additions make eight duplicated services already this year and bookings are still increasing.

In addition it has been found necessary since July to add a third regular service in each direction on the Singapore-Sydney section of the Australia route, whereas the original scheme called for only two.

Cannes Enlargement

AT long last work has begun on the enlargement of Cannes Aerodrome, which is situated at Mandelieu, near the golf course and polo ground. Air France will be the chief beneficiaries, as they will now be able to land and take off their Bloch 220s there with complete confidence. At present the Croydon-Cannes service, which has been running to capacity all through the summer, is operated with the Blochs as far as Marseilles, where a change is made to Wibault *Golden Clippers* for the final stage to Cannes. Additional land has been acquired adjoining the Mandelieu airport which gives a more than adequate runway along the line of the prevailing wind which blows from the south-west. The probable result will be that in future passengers to Cannes will avoid the Marseilles stop altogether and the direct flight from Paris will mean an economy of about 1½ hours on the trip.

The Survey Dragon

AS reported last week, the specially equipped D.H. Dragon for Air Travel and Survey Pty., Ltd., of Sydney, has been fitted out by Rollasons, Ltd., to replace the machine that was crashed last spring shortly before leaving for Australia. The replacement machine left Croydon on September 11 for Australia. It is being flown out by Mr. A. Onslow, with Mr. D. Lindsay as radio operator and flight engineer. They expect to make the trip in easy stages in about thirty days.

It will be remembered that the Dragon is equipped with Marconi D/F. equipment electrically coupled with a P.B. automatic pilot, and this equipment will be used both for normal homing purposes and for survey work (in conjunction with a mobile ground transmitter) in Central Australia. The survey Dragon was described in detail in *Flight* of February 24, 1938, and the replacement machine has almost identical equipment.

London-Stockholm-London

LAST Sunday British Airways made a notable piece of commercial aviation history by flying the first of their new Lockheed 14s non-stop from Heston to Bromma (Stockholm) in 4¼ hours, and after refuelling flying it back again non-stop in 6 hours 10 minutes. The average speeds were 212 m.p.h. and 146 m.p.h. respectively. The flight was made at a height of 13,000ft.

The Fourteen was skippered by Mr. E. G. L. Robinson, who was the pilot who flew the Electra which escorted the Prime Minister's machine to Munich last week. The second pilot was Mr. D. S. King, who was one of the two pilots who flew Mr. Chamberlain. The crew of the Fourteen was completed by Second Officer A. G. Nicholson, Senior Radio Officer A. Woodall, and Flight Engineer G. O. Bryers. The passengers were Mr. A. C. Campbell-Orde, Mr. A. R. O. McMillan, Capt. E. Brooke-Williams, all of British Airways, and Mr. S. Heath, of the Marconi company.

It is the intention to put the Lockheed 14s on the London-Lisbon route when it has been surveyed. The service to Portugal will be extended to West Africa and ultimately across the South Atlantic to South America.

Narrowing the North Sea

MAKING the 320-mile crossing from Aberdeen to Stavanger in 2 hr. 3 min., Allied Airways' D.H.86B *Norseman* last week carried a party of civic and business leaders of the North on a "good will" flight to Norway, landing at Stavanger. The passengers, who were the guests of Mr. E. L. Gandar Dower (managing director, Allied Airways), conferred with Norwegian authorities on subjects of interest to British civil aviation and on the North Sea service in particular.

The party included Lord Provost E. W. Watt, Aberdeen; the Provost of Thurso; Viscount Arbuthnott, Lord Lieutenant and Convener of Kincardine; and Col. G. B. Duff. They were the guests of the Burgomaster of Stavanger at a civic reception on the Tuesday night.

Things with Strings

"BALLOON-FLYING danger areas" have now been established in connection with the barrage training centres at Kidbrooke (Kent), Hook (Surrey) and Chigwell (Essex), and details are set out in *Notice to Airmen* No. 201.

Balloons will be flown up to a maximum height of 5,000ft. above ground level, so the areas must not be crossed at less than 6,000ft. when balloon flying is in progress. Neither balloons nor cables will be marked in the prescribed manner by day, but by night the sites from which balloons are being flown will each be marked by a red light flashing twice every second.

Though the Kidbrooke area is rather to the north of the Croydon-Continental air traffic lanes, the Hook area lies right across British Airways' Heston-Paris route. Since 6,000ft. could scarcely be attained between Heston and Hook, a detour will presumably have to be made.

One merciful aspect of the implementation is that balloon flying in the Hook area will be suspended when the Croydon Lorenz system is in operation.

The New Licensing Authority

THE Air Ministry announced on September 14 that Sir Kingsley Wood, Secretary of State for Air, has made regulations for carrying out the purposes of the Air Navigation (Licensing of Public Transport) Order, 1938. The regulations came into force on Friday, September 16, 1938. On the same date the main provisions of the Licensing Order also came into force, but not the clause prohibiting the flying of an aircraft in contravention of the Order. The date of the coming into force of the last-named provision will be announced later.

The Order and the Regulations contain the detailed provisions for setting up a licensing system of air transport in the United Kingdom. It is to be administered by a Licensing Authority composed of Mr. Trustram Eve, K.C., as Chairman, Major General Sir Frederick Sykes and Mr. F. R. Davenport, who were appointed by the Secretary of State under an Order dated July 19. Before a licence to operate any air transport service is granted to a company the Licensing Authority may call for and consider information concerning the need for and possibilities of suggested routes, the financial resources and record of efficiency of applicants and the type of aircraft proposed to be used.

A system of publishing applications will be adopted which will afford local authorities, aerodrome owners, public departments and air transport companies an opportunity for making representations or raising objections, and these may be followed by private or public hearings. Licences may be issued for as long as seven years or for less than seven days, and conditions as to efficient operations may be attached to them.

The Order sets out the fees to be paid (£10 per annum for ordinary licences and £1 for very short or provisional licences). Licensees are to make monthly returns of their activities to the Licensing Authority, and may be called upon by the Postmaster General to carry mails on reasonable terms. Each year the Licensing Authority itself is to make a report to the Secretary of State for Air which will be laid before Parliament.

In the initial stage provisional licences of limited duration will be issued to companies already operating air services, who apply for licences within one month (from September 16).

Forms of application for licences under the Order are now available, and may be obtained from the Secretary, Air Transport Licensing Authority, Watergate House, York Buildings, Adelphi, London, W.C.2 (Telephone No., Temple Bar 0063), to whom enquiries regarding the Regulations should also be addressed.

THE ROYAL AUSTRALIAN AIR FORCE

Through the hangar doors at Richmond, the largest station of the R.A.A.F. The Blue Mountains are seen in the distance.

Its History, Problems, Establishment and Equipment: Some Typical Squadrons Visited

By H. F. KING

Illustrated mainly with R.A.A.F. Official Photographs

IT may be advantageous, before discussing the problems of the Royal Australian Air Force and reviewing its current activities, to trace the outline of its history since its inception before the war.

The force may be said to have emanated from the Central Flying School formed at Point Cook in 1912. This school, under the direction of Major H. A. Petre (now a prominent figure in sporting flying and gliding administration in this country) and Group Capt. E. Harrison (now Director of Aeronautical Inspection to the R.A.A.F.), trained the majority of the early Australian military pilots, including the present Chief of the Air Staff, Air Vice-Marshal R. Williams. The next step was to establish an Aviation Instructional Staff on a permanent military basis. Personnel of this unit left for Mesopotamia in 1915 and participated in operations round Kut-el-Amara. Early in 1916 a complete Australian squadron left for Egypt. After receiving various designations this unit became No. 1 Squadron Australian Flying Corps in 1918. Three more units which, by the same token, became Nos. 2, 3 and 4 Squadrons, were sent to France.

In the early part of 1918 the Australian Flying Corps undertook the establishment of its own training wing in England, personnel being drawn either from Australia or from the Australian Imperial Forces then on active service. By the end of the War the A.F.C. had more than 250 pilots and had accounted for the destruction of 400-odd enemy machines.

On return to Australia all units were disbanded until 1920, when it was decided to establish an Australian Air Force, which, during the following year, was named the Royal Australian Air Force. On September 1, 1923, the Air Defence Act received Royal Assent and the R.A.A.F. was given equal status to the Royal Australian Navy and the Commonwealth Military Forces.

Subsequent events which shaped the destiny of the force were the inspection and report by Air Chief Marshal Sir John Salmond in 1928 (economy necessitated postponement of the recommended measures); the

THIS article is the third in the series by a member of the staff of "Flight" who was sent to Australia to obtain first-hand information on military and commercial aviation in the Commonwealth. The previous articles, describing the outward and homeward journeys by Empire flying boat, appeared as follows:—

September 8: England-India.

September 15: India-Australia and Home Again.

The fourth of the series, in next week's issue, will be a survey of civil aviation in Australia.

A Supermarine Seagull of the R.A.A.F. It is essentially similar to our Walrus, and is shown here with wheels down.

expansion allowed by the Estimates of 1935-36; and the Government's new three-year programme for National Defence as outlined by the Prime Minister (the Rt. Hon. J. A. Lyons, C.H., M.P.) on March 24 this year.

It was stated by Mr. Lyons that the Australian Government had a strong conviction, based on the best joint-service advice obtainable abroad, that the Air Force could make a major contribution to the solution of the problem of Australian defence. The proposal was to provide £8,800,000 to complete the Salmond Scheme within three years, bringing up the first-line strength (apart from reserves) from 96 to 198 aircraft. It was considered by the Government's advisers that the increases entailed represented the maximum that could be developed within three years, having regard to the extensive ground organisation to be provided and personnel to be trained.

Orders

It was also explained by the Prime Minister that the Australian Government was in communication with the British Government on the subject of deliveries of aircraft from Great Britain. To provide for the equipment of the new squadrons with suitable aircraft it was decided, he said, to supplement the overseas sources by asking the Commonwealth Aircraft Corporation to lay in stocks of material for a much larger output than the 40 Wirraway general-purpose machines (North American NA-33 licence) then on order. The ultimate changeover to a British type would be contingent, said Mr. Lyons, on the urgency of Australian requirements and the availability of a suitable British design.

Four factors—the completion of the Permanent Air Force and the necessary ground organisation; the local aircraft industry; the expanding resources of civil aviation; and the continued development of air routes—would render possible in an emergency a rapid expansion to a strength which would enable Australia, by her own effort, to repel an aggressor.

It was explained to the writer, during an interview with Air Vice-Marshal Williams at the Air Force Headquarters, Victoria Barracks, Melbourne, that the formation of nine squadrons, one flying training school, two armament training camps, two group headquarters, four station headquarters and one equipment depot is now being undertaken. These additions demand the construction of the following new stations: a two-squadron station at Darwin; a three-squadron station at Canberra; a two-squadron station off the coast of New South Wales; a one-squadron station at Brisbane; and a station for the new F.T.S.

One of the squadrons at Darwin will be a general reconnaissance unit and the second a general purpose squadron, probably equipped with Wirraways.

The squadrons at Canberra will include No. 3, now at Richmond, and will be devoted to army co-operation duties as the situation is close to the Army training centres at Seymour, Victoria, and Liverpool, to the N.S.W. coast, and to the Royal Military College at Duntroon. The aircraft are likely to be Demons and/or Wirraways.

It is hoped to equip the new squadrons in New South Wales with large twin-engined amphibians so that they may function not only as G.R. units but may reinforce at short notice any point in the Commonwealth. As no British amphibian of the size required appears to be

Ansons from Richmond Aerodrome over wooded country in the Blue Mountains.

immediately available it may be that an American type will be adopted. Two types present themselves for consideration: the Sikorsky S.43, which is well established in commercial and naval service, and the amphibian version of the twin-engined Consolidated PBY patrol bomber as used in very large numbers by the U.S. Navy. The C.A.S. explained that the R.A.A.F. had certain responsibilities in New Guinea and other islands which could best be met, in his opinion, with aircraft of this type, as it is by no means easy to establish aerodromes in these localities though there are innumerable small bays. Moreover, there are certain parts of Australia, well off the beaten track, which are hardly likely to be blessed with aerodromes in the near future.

It seems unlikely that the Air Ministry's flying-boat policy will exclude the twin-engined type and it may be that a British machine could be modified, perhaps on the lines of the Consolidated, to meet Australian requirements. The base for the new amphibians is likely to be on Lake Macquarie.

Citizen Air Force personnel will be largely represented in the Brisbane Squadron. A Station Headquarters would also be formed.

The new regular squadron to be based on Perth (Pearce) is likely to be equipped with Wirraways.

Sites for the new F.T.S., the armament training camps, and the new equipment depot had not been finally settled at the time of the interview, but it is likely that one of the armament camps will be at Cressy on an inland lake. In all probability the new F.T.S. will be in the fair-weather Riverina district across the River Murray.

It is planned to replace No. 3 Squadron at Richmond with a fighter squadron and to form and train the new Brisbane Citizen Force Squadron at that aerodrome.

Specialised fighters, it is felt, will have little or no place in the scheme of things, though the new squadron would provide good training in high-speed and high-altitude flying and might make an acceptable present in emergency to Imperial Defence. Moreover, defensive fighters are calculated to benefit public morale. With Australia's predilection toward twin-engined aircraft it may be that the new fighters will be built to the latest bi-motor formula. Should single-engined types be decided upon there is a possibility that a clipped-wing Wirraway with an engine of 1,000 h.p. would be adopted.

On the subject of training aircraft, the C.A.S. informed the writer that a specification had been issued for a low-wing monoplane for *ab initio* work, to be built at Fishermen's Bend and to be powered with a Gipsy Major engine, the licence for which is held by the Commonwealth Aircraft Corporation, which builds the Wirraway general-purpose machine and its Wasp engine. Current *ab initio* types are the D.H. Moth and Avro Cadet.

A Miles Magister was imported a few months ago for purposes of study, but although the Aircraft Development Pty., Ltd. are desirous of building this type (and, incidentally, the Airspeed Oxford) in Australia it is improbable that orders will be placed. It is felt officially that the design and construction of a small trainer would be a good try-out for the staff at Fishermen's Bend. Ansons will eventually be used for advanced twin-engined training.

Anti-Marine

There is no great enthusiasm in Australia for the torpedo bomber, largely because of the expense entailed in training and equipping specialised squadrons. The C.A.S. expressed his faith in the comparatively small dive bomber as exemplified by the Wirraway. Targets, of course, would be mainly cruisers and armed transports. A fast, long-range machine for reconnaissance and bombing is badly needed. Though there have been reports that the Blenheim, in standard or modified form, would be adopted, a more up-to-date type has actually been selected and deliveries should start about halfway through next year.

So far as is possible, future types for the R.A.A.F. will be powered with air-cooled engines.

The Browning belt-fed machine gun, as supplied to the R.A.F., has not yet been taken up, the Mark V Vickers built by the Munitions Supply Board being regarded as the standard fixed gun. It is possible that

The fine R.A.A.F. station at Richmond, New South Wales. A £60,000 mess has lately been added.

An Australian Demon general-purpose machine with Rolls-Royce Kestrel V engine.

the Vickers K class gun will be adopted for use from turrets.

Through the courtesy of Air Vice-Marshal Williams the writer was permitted to inspect the aerodromes at Laverton and Point Cook, near Melbourne and Richmond, some miles out of Sydney.

Laverton houses Station Headquarters, No. 1 Aircraft Depot, No. 1 (Bomber) Squadron, No. 2 (General Reconnaissance) Squadron, No. 1 (General Purpose) Squadron and a Training Depot, the latter being responsible for an armament school, a wireless school and a Communications and Survey Flight.

No. 1 Aircraft Depot (Wing Comm. A. W. Murphy) functions both as a stores depot and an equipment depot. Here is received every item of R.A.A.F. equipment which comes from England, except the requirements for the Seagull squadron in New South Wales.

A batch of Anson IIs had arrived the day before the writer's visit. The wing, it was noticed, is not protected on board ship, but one gathered that of about 60 Ansons imported only very minor damage was found to have been sustained on arrival at Melbourne Docks.

Apart from armament, wireless, hand and machine tools, engines, ground station requirements, and items of personal equipment we saw a supply of old Wapiti seaplane floats held for conversion into towed targets.

Servicing is done on nine types of engine—the Kestrel V, Cheetah IX, Lion V and Va, Jupiter VI, Jupiter VIII F.P., Pegasus III M2, Gipsy Six II and Genet Major.

The depot has its own plant for refiltering used oil. Underground are 2,500-gallon petrol tanks connecting with refuelling points on the tarmac.

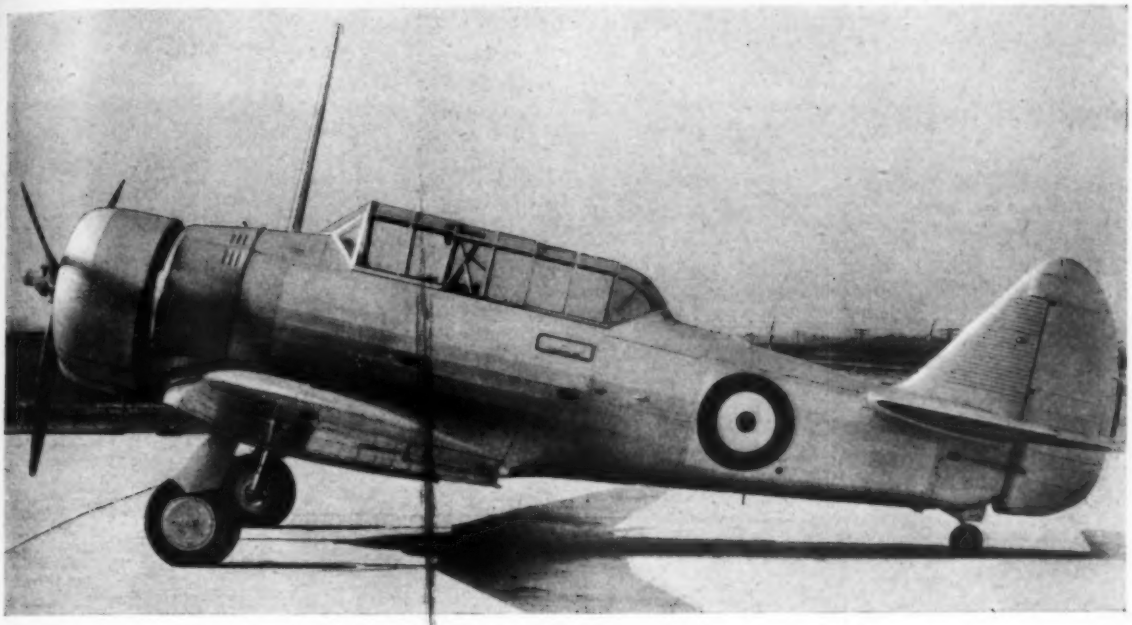
In the erection hangar was a small batch of Wapitis which had been taken over from the R.A.F. to supplement those already in service as trainers. Incidentally the Australian Wapiti, unlike our own service type, has a split axle undercarriage to suit local conditions.

Among the non-technical stores were mechanical transport spares, camp equipment, parachutes, etc. Uniforms are made by the Commonwealth Clothing Factory in association with the Munitions Supply Board. We saw a number of components (tanks, cowlings, etc.) manufactured by the latter Board.

Sections of the depot are allocated to the repair of instruments, wireless and engines (the engine repair shop having departments for air- and water-cooled units) and there are facilities for heat treatment, welding, etc. In the mechanical transport section, where there seemed to be a fair reserve of lorries, there was a trailer designed and built by the Depot for the standard 30-cwt. Bedford. This is intended primarily to accommodate the Anson, but will take any case up to 80 feet in length.

No. 1 (Bomber) squadron (Sqn.-Ldr. A. M. Charlesworth) functions as a fighter-bomber unit and is equipped with the Australian type of Hawker Demon two-seater biplane powered with a Rolls-Royce Kestrel V engine. This machine more closely resembles the R.A.F. Hind than the standard Demon two-seater fighter. Racks for a 500-lb bomb load may be fitted.

Westland Wapiti general-purpose machines (Bristol Jupiter) which are now being used exclusively for training.



The prototype Wirraway general-purpose machine, as now in production at Fishermen's Bend. It is built under licence from North American Aviation, Inc. The engine is a 550 h.p. geared Wasp.

Four of the Demons available have dual controls and one was noticed with a blind-flying hood.

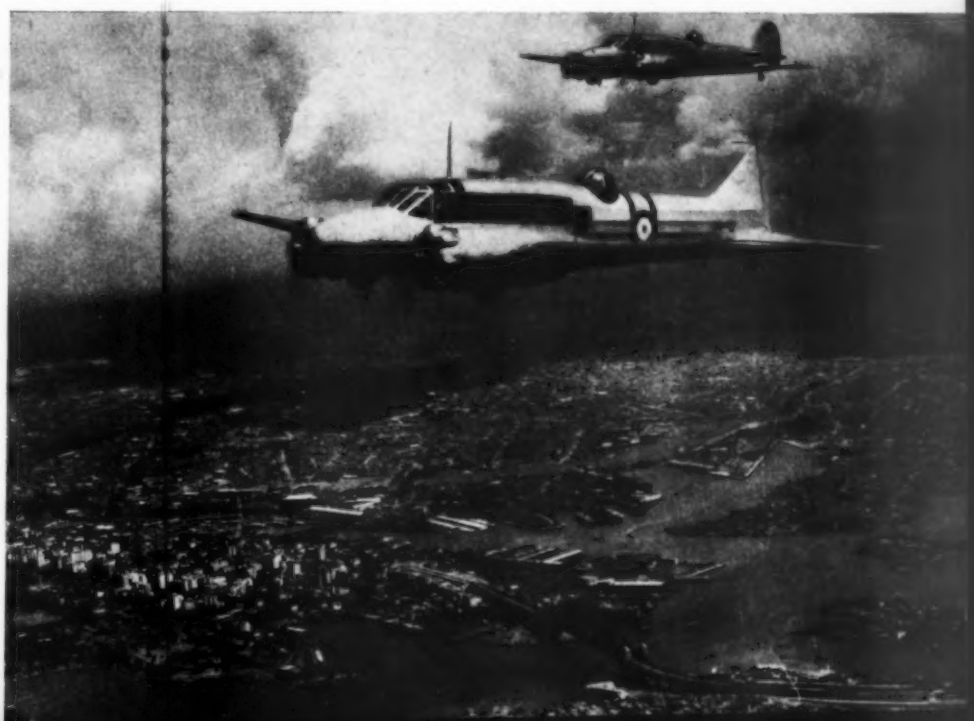
Training is on the lines of that laid down for a light bomber squadron in this country, although there is a greater accent on fighting tactics.

Both Demons and Ansons are being used by No. 2 (G.R.) Squadron (Sqn. Ldr. J. H. Summers). The duties of a G.R. squadron in Australia are essentially similar to those of our own Anson units but entail a greater proportion of cross-country flying.

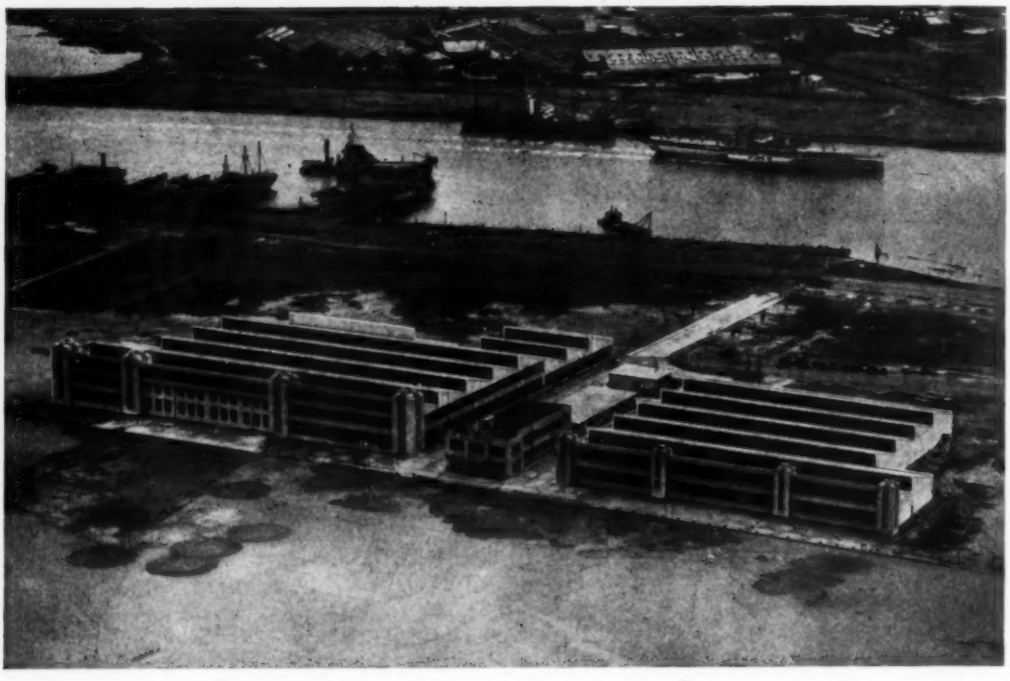
The general-purpose squadron—No. 21 (Sqn. Ldr. C. Eaton)—has its headquarters and one flight composed of permanent personnel with B and C flights of the Citizen Air Force, which may be regarded as the counterpart of our Auxiliary Air Force, being recruited on a voluntary basis. All C.A.F. cadets are trained by their own squadrons, which are usually fortunate enough to get them for a reasonably continuous period during the year. They attend at the aerodrome every second week-end and whenever they feel the call to fly. Once a year they attend an armament training camp like the Regulars.

The Training Depot at Laverton (Sqn. Ldr. E. G. Knox-Knight) embodies the Wireless and Armament schools, and receives all recruit tradesmen and most of the non-technical recruits. Complete instruction to wireless and armament personnel is given, but it is the policy of the R.A.A.F. to enlist only qualified tradesmen for other duties and these receive training only in the application of their particular trade. Non-technical recruits are normally given a drill course before joining their squadrons.

The Communication and Survey Flight is rather unique. Equipped with three Gannet high-wing monoplanes (two Gipsy Six II), two Ansons and a Demon, it has co-operated largely in the Geological and Geophysical Survey of Australia and its work has carried it far into the "outback" areas. The flight is of comparatively recent formation and relieves the regular squadrons of the bulk of the survey duties. Other jobs which fall to its lot are co-operation with the Army



A pair of Ansons from Richmond over the magnificent harbour at Sydney.



The airframe and aero engine factory of the Commonwealth Aircraft Corporation at Fishermen's Bend. Extensions have lately been added.

Survey Corps, photographing for town planning and for fishery and soil investigation.

At No. 1 Flying Training School, Point Cook, Victoria (Group Capt. F. W. F. Lukis) one was given an explanation of the training system in use. The complete course lasts for eight months, six being spent in the junior category, flying Moths and Cadets, and the other half year in the senior, on Wapitis.

Although the training syllabus is basically on R.A.F. lines no elementary training is done outside the Service. Every day there are four instructional periods of 45 minutes each, one being devoted to flying. Four hours' blind flying training is given in each of the senior and junior terms and night flying instruction is also given in both categories.

Apart from the Cadet Wing there is a Seaplane Training Squadron which gives instruction to pilots destined for No. 5 Squadron at Richmond. This unit has an old wooden Southampton, two Seagull Vs, two Moth floatplanes and an Anson.

There is also a School of Navigation for specialist officers to replace the specialist courses given in England.

Apart from the rifle and pistol range there is another for the use of 8½ lb. practice bombs, eight of which are dropped by each cadet. Air-to-air and air-to-ground camera gun training is included in the syllabus and there is a target moored out at sea for practice with live bombs.

Point Cook is virtually two aerodromes in one and sometimes, in order to save congestion, an entire "term" may move over to the northern aerodrome.

The old Southampton is being reconditioned for use not only as an instructional machine but as a pull-off platform for parachute training.

Four squadrons and an Aircraft Depot are accommodated at Richmond aerodrome in New South Wales. The squadrons are No. 3 (Army Co-operation), 4 (General Reconnaissance), 5 (Fleet Co-operation), and 22 (City of Sydney) (General Purpose) and the Depot is No. 2.

Although Richmond is the most up-to-date of the R.A.A.F. stations one of the hangars was actually built during the War for the partial training of officers for the R.F.C. This is now a wood-working shop. The C.O., Group Capt. H. F. de la Rue, conducted the writer round one of the standard Australian type hangars which has workshops, armament and photographic sections under one roof.

No. 3 (A.C.) Squadron is commanded by Sqn. Ldr. A. Walters and is equipped with Demons, which are kept particularly busy during the four months' army training period in the early part of the year. At the time of the visit the Squadron was scheduled to take part in combined operations round Port Stevens during October. The C.O. explained that due to local conditions the squadron can average indefinitely 25 hours' flying per pilot per month. Operational programmes are actually changed so that advantage may be taken of cloudy conditions for blind flying practice. Converging dive bombing is practised against a target towed by a naval vessel.

The general reconnaissance squadron at Richmond—No. 4—is commanded by Wing Commander D. E. L. Wilson and is equipped with Ansons. The Squadron has lately been in the news because one of its machines, carrying the Defence Minister (Mr. H. V. Thorby) and his secretary struck very bad visibility and icing conditions just south of Canberra. The instruments froze and, in the words of Mr. Thorby, "the pilot could not ascertain his speed, altitude or direction." As an outcome of this incident the Australian Ansons are being fitted with electrically heated Pitot heads and engine-driven instrument pumps. The fact that a commercial aircraft passed through the same conditions without difficulty received its due share of publicity.

Incidentally, all new machines for the R.A.A.F. are to be equipped with the standard R.A.F. blind flying

panel, considerably increasing their field of usefulness.

Supermarine Seagull V amphibians with Pegasus engine form the equipment of No. 5 (Fleet Co-operation) Squadron.

Since the departure of H.M.A.S. *Albatross*, seaplane carrier, the Squadron has been organised as a normal three-flight unit. The pilots receive catapult practice when cruisers are available in Sydney Harbour and are all launched at least six times under conditions ranging up to a beam wind.

There is an interesting story behind the adoption of the Seagull V. This machine was designed by the Supermarine Company expressly for use in H.M.A. *Albatross*, and although there was some lag in its production (due largely to preoccupation with R.A.F. orders), the prototype was so promising that it was adopted under the name Walrus for Fleet Air Arm use.

No. 22 Squadron has Demons and Ansons, one flight being regular and the other two composed of Citizen Air Force personnel.

HOME PRODUCTION

Wirraways and Wasps in Production at Fishermen's Bend

It was with considerable thankfulness that the writer was permitted to visit the factory of the Commonwealth Aircraft Corporation at Fishermen's Bend. In view of current misconceptions some clarification of the events leading up to its establishment will not be out of place.

Past delays in the delivery of British equipment to Australia indicated that, in the words of Air Vice-Marshal Williams, it would be almost impossible to obtain equipment from that source. The outcome was that some prominent industrialists were interested by the Government and formed the Corporation.

The interests concerned are Broken Hill Pty., Broken Hill Smelters Pty., General Motors-Holdens, Imperial Chemical Industries of Australia and New Zealand, and the Orient Line. Wing Commander L. J. Wackett, D.F.C., A.F.C., is general manager.

In determining the types of aircraft and engines to be built, the responsible Commission was guided by a number of requirements; British machines were to have preferential consideration. The aircraft desired was a comparatively small two-seater using an engine which would not tax too heavily the manufacturing resources of the company; it was to be wholly or in part of stressed-skin construction; and it was to have a retractable undercarriage, flaps, v.p. airscrew and brakes. In order to estimate the required outlay it was necessary to gather information on the costs of plant and labour.

To cut a long story short, the Commission could not find in England an aircraft which filled the bill and which could be put into production immediately. In America it was presented with a cut-and-dried proposition centring round a low-wing machine designed by North American Aviation, Inc. An analysis of the costing was also available, and the Commission returned to Australia to recommend the construction of the type at Fishermen's Bend factory.

Early last year the Minister for Defence announced the willingness of the Australian Government to place an order for the construction of forty machines and so enable the Corporation to complete negotiations for the manufacturing rights and to proceed with the erection of the necessary plant. A licence was subsequently obtained for the manufacture for all North American types (though only one—the NA 33—was chosen for production) and for the Pratt and Whitney Wasp H.

Unwarranted criticisms, emanating largely from ill-informed sources, have been levelled not only at the alleged lack of patriotism shown by the Australian interests, but at their choice of inferior equipment.

Probably the best answer to the first allegation is that the Royal Air Force has lately placed an order for two hundred machines which will be almost identical with the Wirraway, as the Australian NA 33 is known. The two types will differ, however, in that the English ones will be completely American, whereas the Australian models will have standard British screw threads, etc.

Concerning performance, the Wirraway is capable of about 220 m.p.h. on 550 h.p. and, so far as could be ascertained in preliminary tests with an imported prototype, will be suitable for use as a dive bomber, army co-operation machine and, in lesser degree, as a fighter.

The writer gathered from conversations with R.A.A.F. officers and executives at Fishermen's Bend that the machine is not regarded as anything "super"—merely as a sound type which will find useful and extensive application in R.A.A.F. service until something better can be put into production. The Report of Marshal of the Royal Air Force Sir Edward Ellington, Inspector-General of the R.A.F., urges that the Wirraway should be regarded as a temporary expedient or as an advanced training type.

The urgency of Australian requirements resulted in the initial order being increased to a hundred.

The Factory

The Fishermen's Bend factory stands on a site of about thirty acres at Port Melbourne, near the junction of the Yarra and the Coode Island Canal. In front of the factory is the aerodrome and at the rear a potential wharf and seaplane station. On the left of the administrative block, looking towards the aerodrome, is the engine factory, the airframe section being on the right.

There is no civilian A.I.D. The R.T.O. is Sqn. Ldr. Seekamp, who accompanied the writer round the factory with Group Captain E. Harrison, Director of Aeronautical Inspection. Although a strike was in progress one was able to get an idea of the excellence of the equipment. This does not purport to be a super-detailed technical description, but one recalls the businesslike drawing offices, the engineering or planning departments, the reception and quarantine sections, and the cutting-up section where the material is cut to shape on routing machines before being pressed, drilled, heat treated, anodically treated and given one or two coats of zinc chromate and built up on jigs into the various assemblies. By each jig is a plan showing by means of red lines the availability of parts for the first twenty machines.

One saw routing operations on a pile of twelve light alloy sheets, using a wooden template and a router on a "dog's leg" arm. Then there was a big American machine for sheet metal folding for the spars and some of the ribs (though it is possible to form most of the ribs in the press with a soft metal male die and rubber as the female die); the tube-cutting machine (really a high-speed grinding saw); another for forming the ends; and the welding jigs for the rear section of the fuselage. The first five rear fuselage frames were complete, but the wings were not so far advanced.

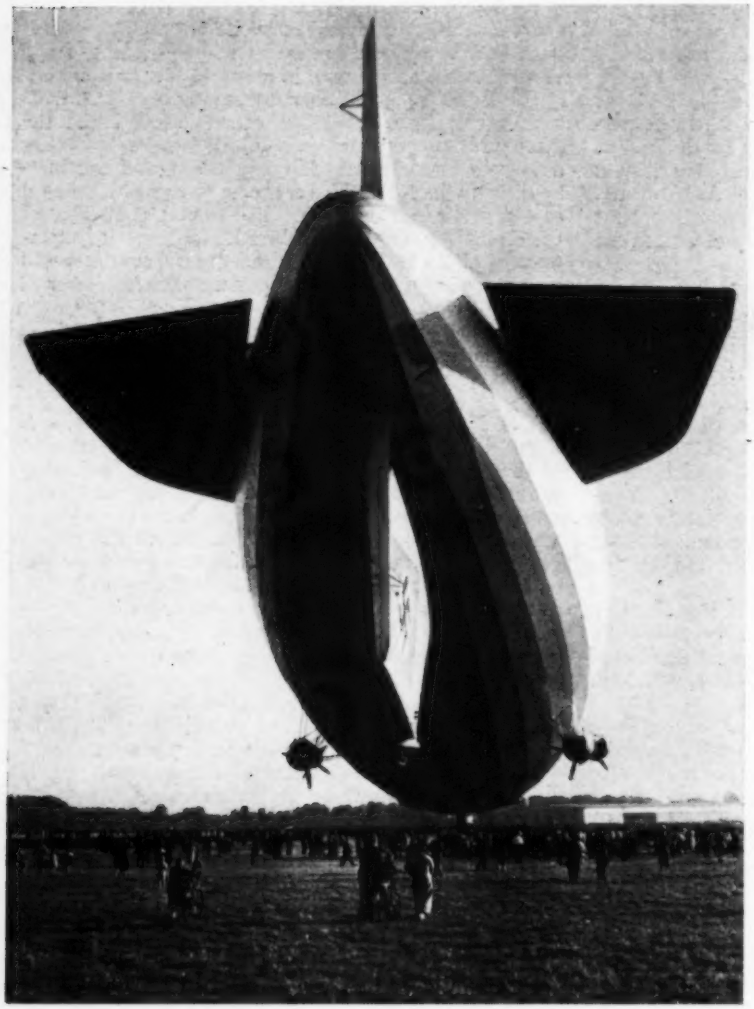
One was fortunate in being able to examine the NA 33 imported from America as a sample. The swept-back outer panels of the stressed-skin wing (which, incidentally, is built in five sections) should make for stability and good vision.

In the engine section was an array of the finest machine tools obtainable, giving the impression that Fishermen's Bend is not only a big contribution to National Defence, but a hobby with its directors.

The first fifty engines will have a fair percentage of imported parts, but eventually all units will be entirely home-produced, including the bulk of the raw materials.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS



THE NEW GRAF ZEPPELIN, LZ130, after her maiden flight of eight hours last week. The ship is temporarily filled with hydrogen.

WATFORD has formed a second squadron of Air Defence Cadet Corps recruits.

Only eleven days after the disastrous Edmonton accident a woman lost her life when a Gauntlet and a Magister of No. 213 (F.) Squadron, Wittering, collided over Stamford, Lincs, and the Gauntlet wrecked and fired a house. The pilot of the Gauntlet and both occupants of the Magister escaped by parachute.

Replacing a Fox Moth which has made 53 medical flights in three years, totalling 18,702 miles, a D.H. Dragon air ambulance has been acquired by Australian Aerial Medical Services. It was named *Dunbar Hooper II* by the Minister for the Interior, and made three SOS journeys totalling 1,500 miles in its first fortnight.

Imperial Airways make a special appeal for the use of lightweight stationery by those sending postal matter over the Empire routes. Such co-operation will mean increased capacity for passengers and freight, as well as for mails.

In view of the unsettled international situation, the tour of metallurgical experts to Canada and U.S., arranged by the Iron and Steel Institute and the Institute of Metals, has been postponed. The party was to have left on September 17.

The Brazilian Minister of Transport has been empowered to reissue invitations for tenders for the erection and operation of an aeroplane factory at Lagoa Santa, near Bello Horizonte. The new factory is intended to supply the needs of the Brazilian Air Force and Naval Air Force.

The imports of foreign aeroplanes and parts into the United States during the six months ended with June last attained a value of only £6,480.

In a flight spread over twelve days, two Soviet pilots have flown from Moscow to Vladivostock and back—a distance of over 10,000 miles—in 53 hr. 40 min. flying time.

To train 25,000 Indian youths in gliding before the end of 1940 is one of the principal objects of the All-India Gliding Institute, which has been recently formed by a number of influential Indians and Europeans.

It has been decided that Allahabad, in the United Provinces, will be the first training centre and a start will be made with 20 selected pupils drawn from various parts of the country. A subsidy is hoped for.

Next Monday, September 26, at 6.30 p.m., the Guild of Air Pilots (14, Thavies Inn, Holborn Circus, London, E.C.1) is holding a conference to which all professional flying instructors are invited. Certain current problems will be reviewed.

Twenty-five Years Ago

(From "Flight" of September 20, 1913.)

"We can only hope that one salient result of the forthcoming manœuvres will be once more to drive home the lesson that modern conditions of war render preparedness in the air just as essential as in any other department of Great Britain's fighting services."

The 200 Lockheed 14 bomber-reconnaissance machines for the R.A.F. will, it is reported, be shipped, disassembled, to Liverpool. Eighty mechanics will be brought over to England to assemble the machines in a Liverpool factory.

In 1933 there were 302 licensed private pilots in Algeria. By last year this figure had been increased to 837. Within the same period the number of private machines had increased from 9 to 113. There are now 42 aerodromes and 129 landing grounds in Algeria.

Visitors to the New York World's Fair will be able to fly right to the fair ground. North Beach Airport is being reconstructed at a cost of £3,000,000 and when completed it will be the finest sea and land air terminal in the United States.

Naming Germany's new airship *Graf Zeppelin*, Dr. Hugo Eckener last week used a bottle of liquid air for the christening ceremony. The ship then made a maiden voyage of eight hours' duration. On Sunday she successfully completed a 26-hour flight. She was designed for helium, but is at present using hydrogen.

SERVICE AVIATION

Royal Air Force and Official Announcements : Fleet Air Arm News : Military Aviation Abroad

VICKERS VINCENT general-purpose machines on Middle East Service. These machines are essentially similar to the Vildebeest.

Higher Appointments

THE Air Ministry announces the appointment of A.V.-M. John Hugh Samuel Tyssen, M.C., to be Air Officer Commanding, British Forces in Iraq, with effect from September 20, *vice* A.V.-M. Christopher Lloyd Courtney, C.B., C.B.E., D.S.O., who assumes command of No. 16 (Reconnaissance) Group, on that date.

A.V.-M. Tyssen, born in 1889, was seconded to the Royal Flying Corps as a Flying Officer from the Army in 1915. During the Great War he served in France and was awarded the Military Cross for conspicuous skill and gallantry. He was granted a permanent commission in the R.A.F. with the rank of Squadron Leader, in 1919, and in 1920 he was appointed to command No. 20 Squadron in India. In 1924 he was posted to No. 1 Group Headquarters for Air Staff duties and while there he took a course at the Senior Officers' Army School, Sheerness. From April, 1930, to March, 1935, he commanded the Base at Gosport and subsequently was employed on Air Staff Training Duties and as Senior Air Staff Officer at Headquarters, Fighting Area. He was appointed Senior Air Staff Officer at Headquarters, No. 11 (Fighter) Group, in May, 1936, and Senior Air Staff Officer and temporary Air Officer Commanding at Headquarters, No. 12 (Fighter) Group, in April, 1937. Since December, 1937, he has been employed at Air Headquarters, British Forces in Iraq, successively as Senior Air Staff Officer and Air Officer-in-Charge of Administration.

He was promoted to Wing Commander in 1923, to Group Captain in 1931, to Air Commodore in 1935, and to his present rank in January, 1938.

A.V.-M. Courtney, born in 1890, was commissioned in the Royal Navy in 1909 as a Sub-Lieutenant. Having gained the Royal Aero Club Certificate (No. 328), he served during the War with the R.N.A.S. and R.A.F. in Belgium and France. For his services he was awarded the D.S.O. and C.B.E., and was mentioned in despatches, besides having foreign orders bestowed upon him.

In 1919 he became Deputy Director of Equipment at the Air Ministry and was granted a permanent commission in the R.A.F. as a Wing Commander. Subsequently he served in India and as an Instructor at the R.A.F. Staff College. In January, 1929, he was appointed Deputy Director of Operations and Intelligence at the Air Ministry and in December, 1930, was posted to the Iraq Command as Senior Air Staff Officer. He was awarded the C.B. for services in connection with the operations in Southern Kurdistan in 1930/31. In January, 1933, he was appointed Director of Training at the Air Ministry, as Director of Staff Duties in April, 1934, and as Director of Operations and Intelligence and Deputy Chief of the Air Staff in January, 1935. Since February, 1937, he has been Air Officer Commanding, British Forces in Iraq.

He was promoted to Group Captain in January, 1925, to Air Commodore in January, 1931, and to his present rank in January, 1935.

The Canadian Orders

IT is reported from Canada that Mr. Paul Sise, president of the Northern Electric Company, Canadian subsidiary of the Western Electric Co., is heading the new 1,250,000-dollar central assembly company which will establish two plants at Toronto and Montreal for the assembly of parts of bombers to be built by the Canadian industry for the British and Canadian Governments. Bankers and industrialists are on the board of the new company and the aviation industry is represented by W. J. Sanderson, of Fleet Aircraft, Ltd., Victor M. Drury, of the Canada Car Company, Hubert Pasmore of Fairchild Aircraft, Ltd., W. H. McIntyre of the Ottawa Car Manufacturing Co., and E. Labelle of Canadian Vickers, Ltd.

All Canadian aircraft companies are to share in the orders from the British and Canadian Governments, each plant making certain components. In the first instance engines will be brought from England. The finished machines will be flown to this country from Montreal.

R.A.A.F. Calls for Recruits

THE Royal Australian Air Force is now being expanded, and 900 recruits a year are needed. The chief demand is for fitters and turners, but photographers, wireless operators, instrument makers, and cooks, etc., are also needed.

The R.A.F. in India

THE Home Government is increasing its annual grant to the Government of India for defence purposes by £5,000,000, in order that the defences of India may be brought up to date. As part of this programme it is proposed to re-equip some of the R.A.F. squadrons in India with new types of aircraft.

Recruiting Returns

THE total number of men enlisted during the past week is 700, making a total of 6,680 since the recruiting campaign began twelve weeks ago. The applications during the week for entry in the various classes were 1,403—as airmen 1,281, as pilots 107, and as observers 15.

Fleet Air Arm Ratings

AN Admiralty order gives the scale of pay for air apprentices, air fitters and riggers, and air artificers. Ratings of both the air artificer branch and the air fitter and air rigger branch will first be trained as air apprentices for three years, and on passing out will be rated air fitters or air riggers. They will then serve for two years at sea. Fifty per cent. will then be selected for a further one year's training to qualify for acting air artificer, 4th class, and at a later date a further ten per cent., approximately, will undergo the course for air artificers.

It is interesting to note that the Admiralty does not use the term "airframe," so puzzling to the layman, but speaks of "aircraft frame."

Reunion Dinners

A TWENTY-FIRST anniversary reunion dinner for past and present officers of No. 104 (Bomber) Squadron will be held on Saturday, October 8, at the Royal Air Force Club, 128, Piccadilly, London, W.1. The price of tickets is 7s. 6d. each, exclusive of wines. Officers desirous of attending the dinner should communicate with Sqn. Ldr. D. P. Lascelles, R.A.F. Station, Bassingbourn, Kneesworth, Royston, Herts.

The Royal Flying Corps Wireless Operators Old Comrades Association was formed in 1930 to foster the spirit of comradeship created during the Great War. Membership is open to all wireless operators who served in the R.F.C. and R.A.F. up to 1919.

The annual dinner is to be held on Saturday, October 22, 1938, at the Princes Restaurant, Piccadilly, London, W.1. Full particulars may be obtained from the Hon. Secretary, at 64, Arlington Road, London, N.14.

Service Aviation

AFGHAN TRAINEES: Eight Afghan officers recently completed an official course of elementary flying training with the Aeronautical Training Centre of India, Ltd., Delhi. The training followed standard R.A.F. civil school practice except that a total of 75 hours dual and solo per pupil was required. The pupils are seen here with members of the staff, among whom are (seated, left to right) Sgt. H. P. Ealey, R.A.F. (instructor), Capt. A. T. E. Eadon (principal), Wing Cdr. E. I. Bussell (O/C training), Capt. R. Pierce (C.F.I.), Capt. Hazir Mohd. (liaison officer).

Royal Air Force Gazette

General Duties Branch

The following Flight Lieutenants are granted permanent commissions in that rank (September 2):—G. J. Grindell, J. S. McLean, G. A. M. Pryde, D. S. Radford.

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—P. S. Hutchinson, W. O. Jones (August 7); J. H. Chaplin (seniority, December 3, 1937) (September 3).

Lt. N. McI. Kemp, R.N., Flt. Lt., R.A.F., ceases to be attached to the Royal Air Force on return to Naval duty (August 29); Lt. the Hon. P. C. Carew, R.N., Flt. Lt., R.A.F., ceases to be attached to the Royal Air Force on return to Naval duty (September 1); Sqn. Ldr. J. F. F. Pain (Lt., R.A.R.O.), is transferred to the Reserve, Class C (August 31); Flt. Lt. J. N. McAuley is transferred to the Reserve, Class A (September 1).

The following Flight Lieutenants are transferred to the Reserve, Class C, on the dates stated:—G. J. I. Clennell (August 26); L. V. Bennett, M.C. (September 8); R. H. S. McConnell (September 9).

The following relinquish their short-service commissions on appointment to the Air Branch of the Royal Navy on the dates stated:—Flt. Lts. P. B. H. Butler and J. S. Leslie (September 1).

Equipment Branch

Flt. Lt. E. R. Berry is granted a permanent commission in that rank on completion of probationary service (April 19, 1937).

Accountant Branch

The following Flying Officers (Acting Flight Lieutenants) are promoted to the rank of Flight Lieutenant (June 1):—C. G. Stowell, T. E. Horsfield.

Medical Branch

The following Flight Lieutenants are granted permanent commissions in that rank (September 2):—A. S. Amsden, M.R.C.S., L.R.C.P.; R. S. B. McClean, M.B., B.Ch.; R. L. Soper, M.R.C.S., L.R.C.P.

Group Capt. D. Ranken, M.B., M.S., F.R.C.S., L.R.C.P., is placed on the retired list (September 7).

Chaplains Branch

The following are granted short service commissions with the relative rank of Squadron Leader on the dates stated:—The Rev. A. L. Bryan, M.A. (September 1); the Rev. T. Hourigan (September 2).

Princess Mary's Royal Air Force Nursing Service

Sister Miss S. P. A. Byrne resigns her appointment (September 11)

Auxiliary Air Force

General Duties Branch

No. 615 (County of Surrey) (Army Co-operation) Squadron.—F/O. G. A. B. Cooper is promoted to the rank of Flight Lieutenant (June 27).

Royal Air Force Appointments

General Duties Branch

Air Commodore.—G. B. Dacre, D.S.O., to R.A.F. Station, Halton; to command, 2.9.38.

Group Captain.—F. E. P. Barrington, to H.Q., R.A.F., Mediterranean, Malta; to command (temporarily) vice Air Vice-Marshal P. C. Maltby, D.S.O., A.F.C., 26.7.38.

Wing Commanders.—H. G. Bowen, M.B.E., to H.Q., No. 26 (Training) Group, Hendon; for duty as Inspector of Elementary and Reserve Flying Training, 3.9.38. G. W. Bentley, D.F.C., to R.A.F. Station, Kalafrana, Malta; to command (temporarily) vice Group Capt. F. E. P. Barrington, 23.7.38. A. MacGregor, M.B.E., D.F.C., to Deputy Directorate of Organisation, Air Ministry, vice Wing Cdr. H. G. Crowe, M.C., 1.9.38. C. F. Toogood, to No. 102 (B.) Squadron, Driffield; to command, 1.9.38. J. L. Findlay, M.C., R.N.Z.A.F., to No. 48 (G.R.) Squadron, Eastchurch; to command, 1.9.38.

Squadron Leaders.—E. M. Drummond, to Electrical and Wireless School, Cranwell; for Signals duties, 29.8.38. W. T. F. Wightman, to Recruits Sub-Depot, Dishforth; to command, 29.8.38. L. E. Goodman, to R.A.F. Station, Halton; for Engineer duties, 1.9.38. C. H. V. Hayman, to No. 3 School of Technical Training (Men), Manston, 1.9.38. D. S. Brookes, to Special Duty List, 29.8.38. J. Marsden, to H.Q., No. 23 (Training) Group, Grantham; for Air Staff (Maintenance Liaison) duties, 19.8.38. V. P. Feather, to H.Q., Fighter Command, Stanmore; for Engineer Staff duties, 5.9.38. C. D. Adams, to H.Q., Bomber Command, Uxbridge; for Air Staff (Operations and Training) duties, 15.8.38. A. G. Thackray, to H.Q., No. 2 (Bomber) Group, Wyton; for Air Staff duties, 5.9.38. G. D. Green, to No. 11 F.T.S., Shawbury; for Engineer duties, 18.8.38.

Flight Lieutenants.—H. F. Chester, to No. 35 (B.) Squadron, Cottesmore, 5.9.38. H. I. Dabinett, to No. 149 (B.) Squadron, Mildenhall, 5.9.38. A. C. P. Carver, to No. 85 (F.) Squadron, Debden, 12.8.38. F. E. H. Cooper, to No. 5 F.T.S., Sealand, 19.8.38. G. A. Walker, to Directorate of Armament Duties, Air Ministry, 1.9.38. R. H. Harris, to No. 48 (G.R.) Squadron, Eastchurch, 1.9.38. T. J. MacDermot, to H.Q., No. 26 (Training) Group, Hendon, 23.8.38. E. M. Donaldson, to No. 7 Flying Training School, Peterborough, 16.8.38. R. G. Stone, to R.A.F. Station, Gosport, 29.8.38. N. W. Wakelin, to R.A.F. Station, Calshot, 29.8.38. K. D. Salmon, to Experimental Section, Royal Aircraft Establishment, South Farnborough, 29.8.38. G. W. Gay, to H.Q., Maintenance Command, Andover, 29.8.38. G. H. Foss, to Experimental Section, Royal Aircraft Establishment, South Farnborough, 29.8.38. H. R. Tidd, to No. 9 F.T.S., Hullavington, 29.8.38. G. Thripp, to H.Q., R.A.F., India, Simla, 6.9.38. C. J. Giles, to H.Q., No. 26 (Training) Group, Hendon, 1.9.38.

Equipment Branch

Squadron Leader.—C. N. Scott, to H.Q., Maintenance Command, Andover; for Air Staff duties, 29.8.38.

Flight Lieutenant.—F. G. Lee, to Directorate of Equipment, Air Ministry, 29.8.38.

Medical Branch

Flight Lieutenant.—R. H. Pratt, to R.A.F. Station, Abbotsinch, 5.9.38.

Accountant Branch

Squadron Leaders.—W. R. Donkin, to Home Aircraft Depot, Henlow, 29.8.38. F. M. Hall, to R.A.F. Station, Eastchurch, 29.8.38.

Flight Lieutenant.—D. Lumgair, to No. 8 Armament Training Station, Evanton, 27.8.38.

Chaplains Branch

Rev. T. M. Jones, to No. 4 School of Technical Training (Men), St. Athan; for duty as Chaplain (Presbyterian), 1.9.38. Rev. W. L. O'Neill, to H.Q., R.A.F., Aden; for duty as Chaplain (C. of E.), 6.9.38.

Owing to the greatly increased length of these lists, as a result of R.A.F. expansion, ranks are confined to those of Flight Lieutenant and above.

SERVICE AVIATION (CONTINUED)

Apprentice Clerks

TO meet increased requirements under the new recruiting programme, a substantial number of boys of school certificate, or approximately equivalent, educational standard, will be required to fill vacancies for apprentice clerks in the R.A.F. These vacancies will occur in October, 1938, and in January, 1939.

Candidates must be not less than 15½ years of age and not more than 17½ on October 1, 1938, and January 1, 1939, for the October and January entries respectively.

Conditions of entry may be obtained on application to the Inspector of Recruiting, R.A.F., Victory House, Kingsway, London, W.C.2.

Apprentice clerks are trained for approximately eighteen months and are attested for twelve years' regular R.A.F. service dating from their eighteenth birthday. They are clothed, fed, accommodated and given free medical attendance and receive pay while under training. At 18 years of age the commencement rate of pay as airmen is 22s. 9d. per week.

Their work includes administrative duties, shorthand, and, in certain cases, accounting for pay and equipment. They are usually required to spend some time overseas.

A limited number will be permitted to re-engage to complete 24 years' service in all and thus will qualify for a pension. On returning to civil life apprentice clerks who complete only the first period of 12 years' service may on discharge from the active list be allowed to enter the Reserve and to draw a gratuity of £100.

All apprentice clerks may volunteer for training as airmen pilots. Those selected become Sergeant Pilots on completing their training and are normally employed on flying duties for six years. Specially qualified airmen pilots may be recommended for permanent commissions in the General Duties Branch. A limited number of permanent commissions in the Accounting and Equipment branches may also be granted.

Flying Accidents

THE Air Ministry regrets to announce the following accidents:—

A.P/O. Robert Ernest Winter (pilot flying solo) lost his life in an accident which occurred near Poulton, Gloucestershire, on September 13, to an aircraft of No. 3 Flying Training School, South Cerney, Cirencester.

Sgt. Thomas Frederick Dowsett Dewdney (pilot flying solo) lost his life in an accident which occurred at Holbeach Ranges, Lincolnshire, on September 14, to an aircraft of No. 87 (Fighter) Squadron, Debden, Essex.

Since the disappearance on September 12 of an aircraft of the Communication Flight(, Ramleh, Palestine, it must now be assumed that P/O. Desmond Edward Bell and Lt. Frederick Scarborough (late Royal Air Force), lost their lives on that date. P/O. Bell was the pilot of the aircraft and Lt. Scarborough the only other occupant.

F/O. Kenneth Gerald Stodart, A.F.C., died in the Princess Mary's Royal Air Force Hospital, Halton, Buckinghamshire, on September 15 as the result of injuries received in an accident which occurred at Wyton, on September 13, to an aircraft of the R.A.F. Station, Wyton, Huntingdonshire. F/O. Stodart was the sole occupant. [It may be recalled that F/O. Stodart flew in the MacRobertson Race in 1934 with his uncle in an Airspeed Courier, finishing in sixth place.]

FOREIGN SERVICE NEWS

East Indian Trainers

THE Government of the Dutch East Indies has ordered twenty-five Koolhoven FK 51 advanced trainers. The machines will be powered with Pratt and Whitney Wasp engines. The FK 51 is a sturdy biplane with tandem open cockpits.

The Swiss Moranes

THE first of a batch of Morane-Saulnier MS 406 C1 single-seater fighter monoplanes ordered by the Swiss Air Force has been delivered to Berne. The machines are fitted with Hispano Suiza 12 Y 31 liquid-cooled vee-twelves and Chauviere variable-pitch metal airscrews.

France's Aerial Cruiser

TESTS are now in progress with the Latécoère 525 long-range naval flying boat. This is a direct development of the *Lieutenant de Vaisseau Paris* commercial type but has more powerful engines—Hispano Suiza 12 Y 27 of 885 h.p. each—and provision for guns and a heavy bomb load. The top speed is said to be in the neighbourhood of 160 m.p.h.

Fokker D.21 Breaks Dutch Record

ON September 3 Mr. Leegstra, a test pilot employed at the Fokker Aircraft Works, made an attack on the Dutch altitude record, which at the time stood to the credit of Flt. Lt. Jhr. R. Wittert van Hoogland, who, in January, 1935, had reached a height of 33,400ft. in a Fokker D.17 single-seater fighter.

The machine used to secure the new record was a Fokker D.21 single-seater powered with a Bristol Mercury VIII radial giving a maximum power of 830 h.p., and the height attained was 37,250ft.

What is particularly interesting about the flight is that the machine was a standard service type carrying a full military load. In their catalogue the manufacturers quote a ceiling of less than 32,000ft.

The Not-so-Pacific

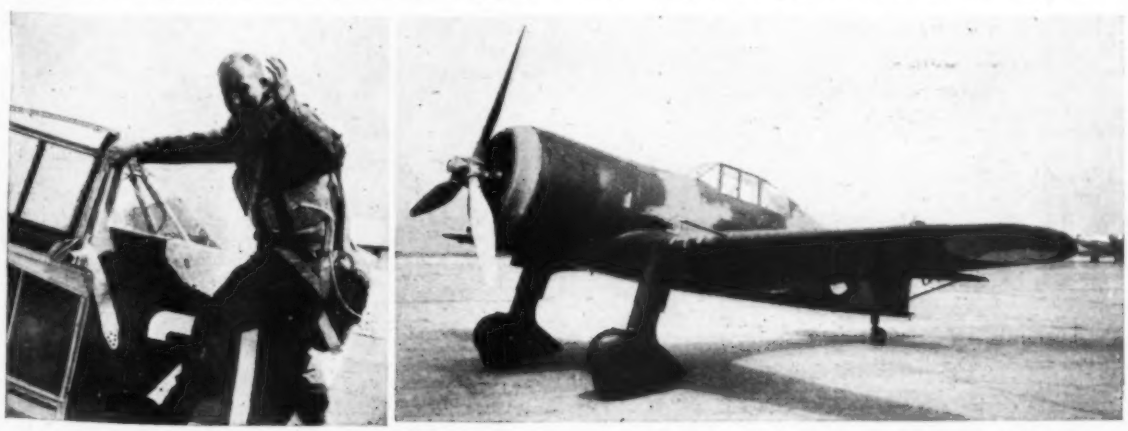
WHILE Pan-American Airways are preparing bases for the trans-Pacific services to New Zealand, the U.S. Army and Navy are also at work in the area. The U.S. Government has purchased some of the atolls in the Palmyra Group, about a thousand miles south of Hawaii. They are tiny dots of coral grouped about a large lagoon.

The naval authorities are now erecting a radio station to co-ordinate the bases which have been strung across the Pacific in a line from Kodiack Island, Alaska, through the Midway Group to Pago-Pago, Samoa. This enormous crescent is the advanced line of American air power in the Pacific. The Legislature, it is reported, has voted the vast sum of £6,000,000 for the development of the radio stations alone.

Heinkels for Norway

THE Royal Norwegian Naval Air Force, according to a Scandinavian correspondent, has ordered six Heinkel He. 115 twin-engined torpedo bombers for delivery in the summer of 1939. The He. 115 is a typical Heinkel product, all-metal, and powered with two B.M.W. radial engines (Pratt and Whitney Hornet licence). Although detailed figures have not been released it is believed that the projectile load is about 2,250 lb. and the maximum speed between 210 and 220 m.p.h. Tankage can be fitted for a range of about 1,000 or 1,500 miles.

As delivered the machines will be fitted with full wireless equipment, blind-flying gear and machine guns or light shell guns.



Mr. Leegstra, the pilot who, as related above, recently made a Dutch altitude record of 37,250ft. with the Fokker D.21 (Bristol Mercury VIII) seen on the right.

PRIVATE FLYING

"*Flight*" photograph.

COMFORT FOR THE C.A.G.: Mr. R. C. Christoforides, director of the Chrislea Aircraft Co., and Mr. Dawson Paul, test pilot (nearest camera) in the roomy cabin of the new Chrislea Airguard. The machine was described in *Flight* last week.

Topics of the Day

Radio Again

DURING the past six months there has been a depressing silence on the subject of the provision of radio facilities for the private owner and amateur. I say depressing because this idea has always been of particular interest to me, and there was (and, perhaps, still is) a very good chance that one radio manufacturing company, at least, would go ahead with the production of a light and inexpensive direction-finder suitable for use in light aeroplanes.

Possibly this company has very wisely given up the idea—wisely, that is, from their own financial point of view, though there would be a certain amount of return to them in the form of prestige.

It seems to me that the real trouble is that direction-finding or homing equipment, by itself, is not sufficient to be useful, though it might provide a good deal of amusement and some encouraging support when one is momentarily lost. It would, too, be least useful and accurate during the night, which is just the time when it really would be a convenient part of a machine's equipment. The possibility of serious night flying by amateurs and private owners rests largely on the provision of some form of radio assistance and, conversely, the need for this equipment depends on the amount of such flying carried out by these pilots.

I am not quite sure how experiments are progressing in the way of practical short-wave direction-finding, though high frequency is being used very successfully for this purpose on both Pacific and Atlantic services, with the use of very special ground equipment.

The short-wave bands have always seemed to offer very useful possibilities for the amateur and not long ago I had a good look at an example of the sort of equipment which is now fitted to fighting machines. In this the necessary controls have been reduced to an absolute minimum and consist simply of a pre-set wavelength adjuster—which in our case could be done away with—and a "press-to-speak" button which does the rest of the work once the equipment has been switched on. Presumably, this equipment is fairly expensive in present form, and, in any case, would be quite useless unless the majority of the civil aerodromes possessed and kept watch beside a suitable short-wave outfit.

Some time ago I suggested that all aerodromes not used for commercial traffic might carry such equipment, but, so far as I know, the needs of the amateur were hardly mentioned at the Cairo Conference on wireless matters held earlier this year, and in any case the provision of the necessary ground installations would demand more public spirit than is usually apparent in such matters.

Two-way Importance

THE point about the fighter equipment—forgetting the fact that it may not be satisfactorily usable for homing or direction-finding—is that it provides two-way communication. And this ability both to listen and to talk is of tremendous psychological value. It is all very well listening in to Borough Hill and learning that such-and-such an aerodrome has reasonable visibility and not-too-low cloud height; it is so much more comforting to talk to someone actually at the aerodrome and to learn, in particular, that the conditions have not deteriorated in the meantime.

To which the professional control officer would naturally rejoin, "What right has the amateur to flounder through the sky in the sort of conditions in which any radio equipment would be valuable?" The answer is, "None," but if the amateurs' radio needs were seriously considered and suitable arrangements were made, then he or she would be controlled like all other important traffic, and would have the same number of privileges and suffer under the same regulations.

There has been, in fact, at least one short-wave transmitting and receiving outfit on the market and this was originally, at any rate, designed to suit the needs of the amateur owner in conjunction with private ground stations. Very little support was forthcoming when this equipment was introduced and I believe that the firm concerned has now left it behind and gone in seriously for the manufacture of more earnest medium-wave equipment for use on commercial machines. However, it is possible that the original type of equipment is still available if anybody cares to take an interest in it, and if the powers that be will allow anyone to use it.

Real Equipment

IN the meantime, one private owner, apart from those who use fully equipped and professionally flown transport machines, has fitted his light aeroplane with full two-way medium-wave equipment for use in proper collaboration with the present radio control network.

This owner is lucky in that his home station is one with a short-range direction-finding station which is not put to a great deal of use by the two transport companies calling at the aerodrome. The result is that during the next few months he should have plenty of opportunity of practising with his equipment, particularly in relation to bad weather approaches on a series of magnetic courses-to-steer, which in Q-code parlance are known as QDMs

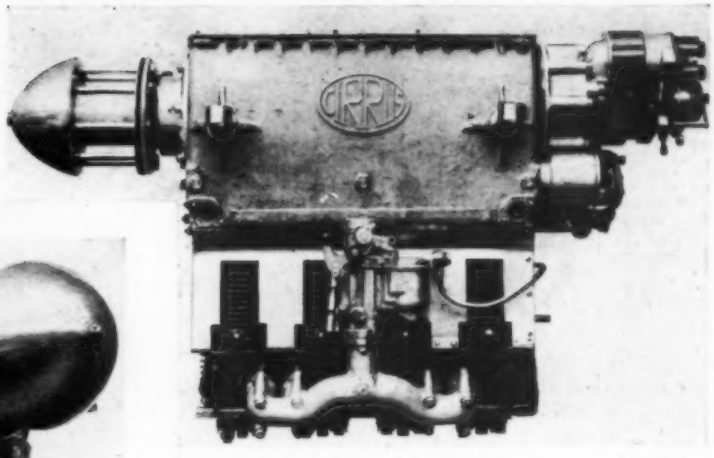
Obviously, if such a private operator is not going to be a nuisance to the present rather over-busy radio systems, he must be entirely competent and be indistinguishable, so far as this is concerned, from the professional pilot and/or operator. At Croydon, for instance, it is probable that in really bad weather he would simply get no attention at all if his methods were inefficient. Practice, therefore, is most necessary.

From his own so far limited experience, this owner considers that the ideal equipment for a private owner is two-way R/T with D/F so that so far as bearings and fixes are concerned, he can be reasonably independent of the busy ground stations until the final approach—when he would need two or three QDMs.

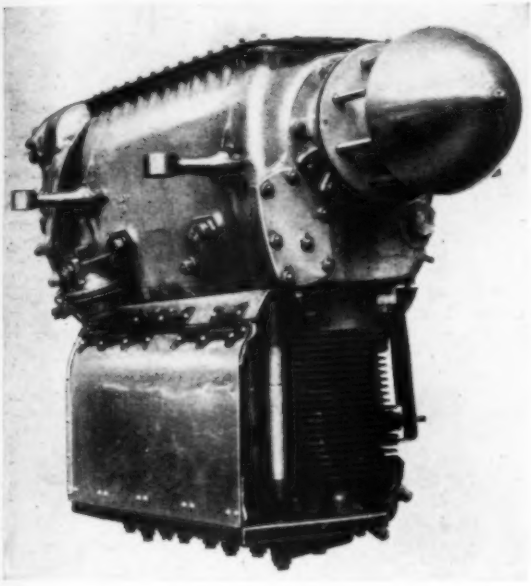
INDICATOR.

THE CIRRUS MIDGET

New 50 h.p. Unit



Typically Cirrus in appearance, the Cirrus Midget will be shown for the first time at the Paris Show



FOR some considerable time the Cirrus Co. has had under development a new 50 h.p. four-cylinder in-line air-cooled engine known as the Cirrus Midget. According to the manufacturers, the unit is on "cheap but sturdy" lines and should enable cheaper aircraft to be produced in order to create a larger market.

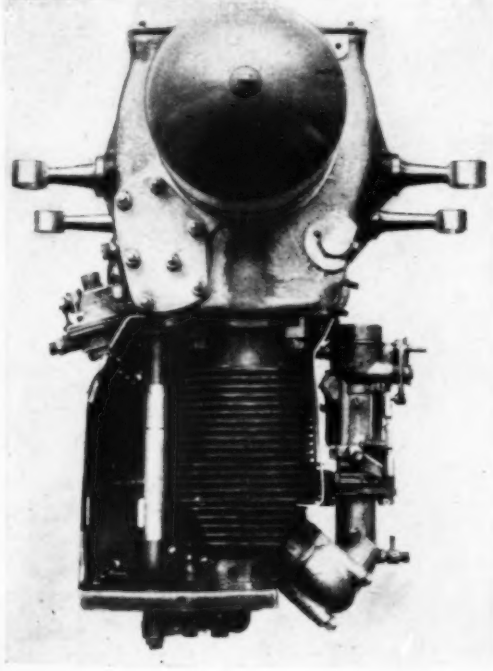
Originally the unit embodied a monobloc casting containing four cylinders with side valves. In the current type, however, the cast-iron cylinders are located at their base by four holding-down bolts, and the heads are integral with the cylinders. Overhead-valve gear is fitted, operating through enclosed valve rockers and push-rods from the camshaft. The airscrew is directly driven. On the side of the engine is an Amal petrol pump with hand-operating levers. An Amal flame trap is fitted in the induction system.

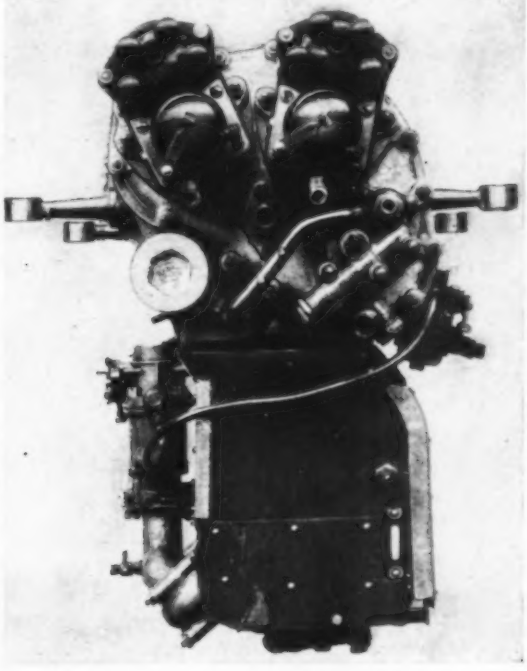
The makers have issued the following estimated figures (not guaranteed) to give designers an indication of what may be expected from the unit. Obviously, it should have wide application in the Civil Air Guard.

The weight should be about 155 lb. (±5 lb.) with single ignition, one petrol pump, controls, cooling chute, airscrew boss, spinner, oil drainpipe, induction system, enclosed rocker gear, and bearer feet.

Other data are: 48-49 h.p. at 2,300 r.p.m. (normal), 55 h.p. at 2,600 r.p.m. (maximum), 45 h.p. (approx.) for take-off, 49 h.p. at 2,300 r.p.m. for initial climb. The fuel consumption should be about 2½-2¾ gal. an hour at cruising r.p.m. (2,200-2,300), and maximum permissible diving r.p.m. are 2,730. The oil consumption should be approximately ¾ pt. per hour.

The compactness of the new Cirrus engine should delight designers of machines for the Civil Air Guard





Private Flying

FROM the CLUBS and SCHOOLS

Flying and Social Activities: C.A.G. Progress

MARSHALL'S

THE flying time at Marshall's School totalled 89 hours for the week ended September 17. This included cross-countries to Eastbourne, Hatfield, Croydon, Lympne, and Hamble. Members of the C.A.G. have commenced flying and are making good progress.

HYDERABAD

Many very long cross-countries were made by the Hyderabad State Aero Club and a total of 91 hr. 30 min. flying was put in. There are now 77 members in the club.

REDHILL

Cross-country flights to Aberdeen and Leicester helped to make a flying total of 209 hr. 10 min. for the week ended September 17. Three new members were received and the squash season has opened.

READING

Flt. Lt. Tommy Rose has joined the club as chief instructor. Miss Joyce Adey made her first solo flight and five new members joined the club. The C.A.G. is very active and the first course is well under way.

HULL

Full particulars of the arrangements and terms under which a unit of the Civil Air Guard has been formed in connection with the Hull Aero Club are now available. The first batch of new entrants have been notified of their selection.

C.A.S.C.

During the week 26 hr. 25 min. were flown. Good weather prevailed on Sunday at Cambridge but two machines on cross-country flights to Clacton encountered storms and another two machines en route for Grimsby were forced to make a detour.

HERTS AND ESSEX

At Broxbourne the Sunday before last the competition for the Mollison Challenge Cup was flown off, taking the form of simple aerobatics. Mr. Archer Edwards qualified for first place with Mr. J. H. Rayner second and Mr. A. R. Saward third.

SOUTHEND

The Southend Flying Club have made a good start with their C.A.G. pupils, and no fewer than five have gone solo. They are Messrs. Fey, Lister, Wickett, Cunningham and Groom, while Mr. A. F. Beechey has completed his "A" licence tests.

NORTHAMPTON

Club members were very active last week and three machines took part in the Dawn Patrol at Leicester on Sunday, September 11. The annual dance will be held at the Salon de Danse, Northampton, on Friday, October 14. The first 25 Civil Air Guards have made rapid progress since they commenced training on September 1, and it is anticipated that a further 25 will be selected very soon.

NORFOLK AND NORWICH

Of the 60 hours flown last week, the majority was contributed by the Public Schools Aviation Camp members before their departure. The Noel Hill Cup, which is presented each year to the Camp, was won by R. A. Shuttleworth, of the Nautical College, Pangbourne. With the combined efforts of Dr. Harold Birchall, the Baron de Sarigny, Mr. N. Brett, and the boys themselves, the camp proved its usual great success. In the club's gliding section all craft were in the air during the week-end, whilst Mr. D. G. Moyniham passed his long-distance cross-country tests for his "B" licence on the power side.

BARTON (BEDS)

A dance will be held for the C.A.G. members on October 1. Enthusiastic flying has taken place from 9 a.m. to sunset each day, assisted by excellent weather, and large numbers are still signing up for the C.A.G. Mr. C. R. Tapper and Mr. T. C. Cook made their first solos.

YORKSHIRE

The C.A.G. is now in full swing and the weather has to be actually QBI before there is a cessation of activity. An average of 12 to 15 hours per day is quite usual. The total flying for the week ended September 16 was 83 hours, bringing about a total of 173 hours for September.

BORDER

Unlike those at most other places, the C.A.G. enthusiasts here find week-end flying difficult, and prefer to book up for the week-days. In the club section flying totalled 54 hours for the two weeks in September. Mr. J. Gloerfelt-Tarp, a Danish student, made a successful first solo. Mr. H. I. Lang joined the staff as assistant instructor and Mr. Ross as assistant ground engineer.

SOUTH COAST

Arrangements are in hand for the annual dinner and dance, to be held at the Grand Hotel, Brighton, on October 15, and tickets are now available. Twenty-six hours' flying were put in last week, and Mr. W. J. Allen qualified for his "A" licence. Under the C.A.G. scheme "A" licence holders have been doing much solo flying. Mr. W. E. Holland has joined the club staff as an instructor to assist Mr. C. L. Pashley.

LONDON

Three competitions—aerobatic, forced landing and map reading—were held over the week-end and the results are:—Aerobatics: 1, Mr. H. Greenshields; 2, Mr. J. Keegan; 3, Mr. A. P. Dixon. Forced landing: 1, Mr. B. H. Marriage; 2, Miss J. Hughes; 3, Mr. I. Kestin. Map reading: 1, Mr. C. R. A. Grant; 2, Mr. J. Keegan; 3, Mr. C. L. Elliott. One hundred and fifty-four hours were flown during last week and Messrs. F. R. Pickard and W. E. Robinson made their first solo flights.

EDINBURGH

Heavy winds have rather restricted flying at Edinburgh and only 16 hours were logged for last week. In the C.A.G. section 5 hours were flown and a first solo was made by Mr. A. G. Hunter. Progress has been somewhat hampered owing to shortage of aircraft and instructors. A demonstration of the Tipsy was given by Mr. Eric Ward recently. Flying for the week ended September 10 totalled 27 hours and Messrs. J. L. Chalmers and J. W. Williamson performed their first solos.

BROOKLANDS

At a board meeting of the directors on September 12 it was decided that for economic reasons it would not be possible to start a C.A.G. section at Brooklands for the present. The directors agree with the scheme in principle, and training for Guard members is available at the South Coast Flying Club and Northamptonshire Aero Club. The service department, though it has been working overtime, has found time to start a Brooklands Aviation Sports Club, for which the old Butts Lodge building has been taken over. Membership already numbers seventy. The weekly tea dances, held on Sundays in the club-house, will begin on the first Sunday in October. Amateur theatricals are also being revived. The Brooklands four-clubs dinner, dance and cabaret will take place at Grosvenor House on Friday, November 18.

TRAINER FROM THE NORTH

YET another firm is busy designing a type of light aeroplane suitable for C.A.G. requirements. Next spring, or earlier, F. Hills and Sons, of Trafford Park, Manchester, should have a monoplane trainer, to be known as the Helvellyn, in production.

This is of conventional tandem-seater layout, since Mr. Norman Sykes, the chief designer to the company, believes that both the instructors and the pupils prefer something which is not, either in flying characteristics or control arrangements, such that retraining will be necessary when passing on to other types. In due course, the somewhat less conventional Pennine, a side-by-side-seater cabin type, with simplified controls (for instance, spoilers to take the place of ailerons), will probably reappear as and when it is required by the private owners or the clubs.

Neither a cabin nor side-by-side seating is, in Mr. Sykes' opinion, desirable for *ab initio* training, and, in any case, the Pennine is sufficiently full of new ideas to be temporarily unacceptable for club use. Nevertheless, with an eye to the future, he is designing the Helvellyn so that a tricycle undercarriage can be fitted if required.

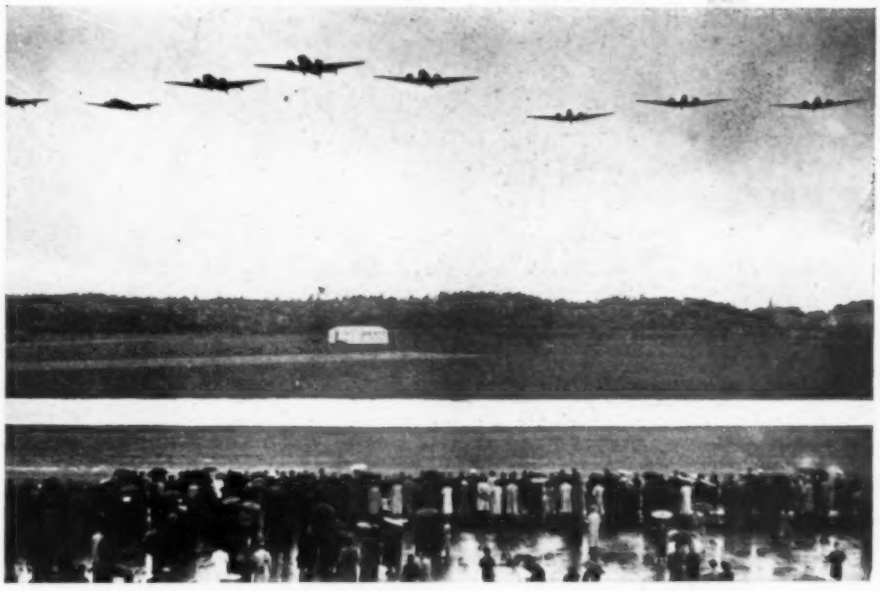
Incidentally, Mr. W. R. Chown, the managing director of the firm, suggested something on the lines of the C.A.G. scheme many months before the present system materialised—and some people laughed at him for his pains.

The Pennine was flown before it was temporarily put on one side and has at least shown that neither a rudder nor ailerons are necessarily needed in ordinary air travel. For directional control there is a trimming tab, while for turning and banking there are specially designed spoilers. While Mr. Sykes was making a tail-up taxying test the machine once took off accidentally with nothing much in the way of properly connected or adjusted controls. It had a strong tendency to turn to the left and about half an hour passed (on a couple of gallons of fuel) before Mr. Sykes could get the machine back to the aerodrome and in the correct approach line. Amusing in retrospect, but fairly terrifying at the time.

For test purposes, and in the absence of the Aspin engine, around which it was designed, the Pennine was flown with the ordinary Praga flat twin. The first Aspin is, however, now coming along well, though it would seem that real developments may be seen first in America.

SWEDEN'S NOT-SO-CIVIL AVIATION WEEK

Service Demonstrations Play a Large Part



Junkers Ju. 86 bombers of the Swedish Air Force stage a fly-past.

CULMINATING during the latter half of the week ended Sunday, September 11, the largest air display and exercises so far staged in Scandinavia has made the Swedish nation, at any rate, thoroughly air-conscious; and (writes a correspondent) despite the fact that service aircraft demonstrations predominated, the purpose of the Civil Air Week was thus successfully achieved.

During the first part of the week a number of aerial attacks were made on the Swedish capital by night and by day, coming to a climax on Friday, September 9, when eight divisions, totalling 70 aircraft, "attacked" the House of Parliament, the central railway station, the National Bank, the war office and a number of important industrial plants. The attacks were successfully fought off by fast fighters and anti-aircraft guns.

An arrival competition had been staged for participants in the civil aviation demonstrations, the deadline being 6 p.m. on Friday. The first competitor to arrive was a Swede, Dahlen, who came from Gothenburg via Norrköping. An additional number of private aircraft arrived on Saturday, including a party of nine Polish sports machines from the Warsaw Aero Club.

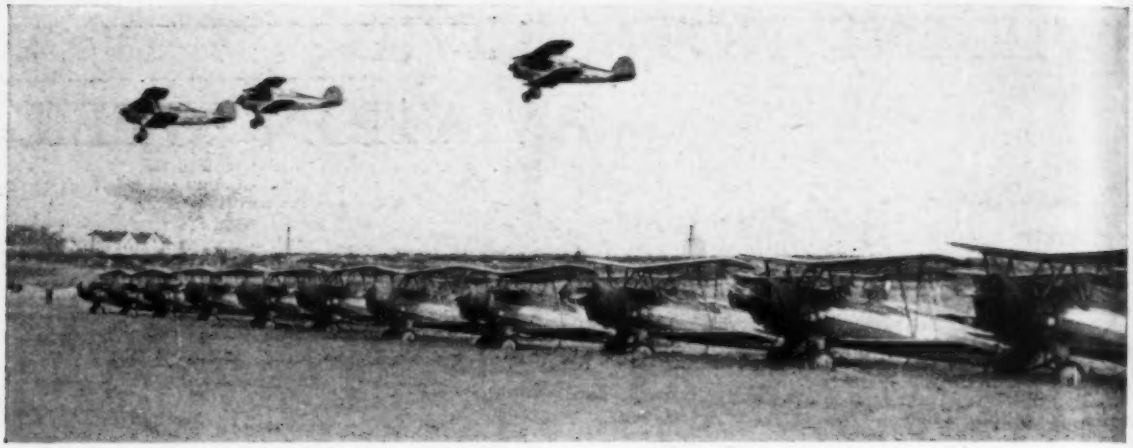
Distinguished spectators: H.R.H. Prince Gustaf Adolf, Princess Sybilla, Major Petersen, secretary-general of the Svenska Aeroklubben.

Swedish Air Force pilots showed skill in handling their machines. Arriving from various military aerodromes, 103 service aircraft landed in Bromma airport within less than an hour without the slightest mishap. A subsequent demonstration of aerobatics, mainly by fighter flights, a fly-past by light and heavy bomber squadrons and a solo aerobatic show featuring the German Fieseler Storch—latest addition to the Swedish air arm, as an A.C. type—monopolised the attention of enthusiastic spectators. The service pilots were very popular with the public, not least because of the advertised fact that the personnel had had no time for special training and that the display was thus a mere demonstration of daily routine. The foreign guests spent the morning in splendid isolation in the hangars, preparing for the afternoon's race for the Angstrom Cup.

The Angstrom Cup, a challenge trophy, has been instituted by Mr. Angstrom, Chief of the Swedish Aviation Department. The competition comprises "time-table" racing over a triangular course of 150 km., navigational calculations and landing tests. The trophy is a large silver cup with ground and engraved glass lid, designed by the architect Erik Fleming.

Seven teams, representing as many clubs, had been entered for the race, but only two completed the task. The race was won by Bengt Olov and Sven Sjögren on a Piper Cub entered by the Malmö Aeroklubb, their debit score being 149.25 points. The next best team, consisting of L. Fellander and Erik Bratt on a Moth Major entered by the Tekniska Högskolan Polytechnic College Flying Club), scored 512.25. The best individual results were attained by the following pilots: (1) N. Edberg, Hornet Moth, 39; (2) Bengt Olov, Piper Cub, 51; (3) S. Sjögren, Piper Cub, 98.25; (4) S. Alm, Bücker Jungmeister, 149; (5) Erik Bratt, Moth Major, 158.25.

The air display which was staged on the following Sunday was severely hampered by bad weather. Visibility was of a low order and the day broke in a light fog, followed by drizzle and occasional squalls. About noon the ceiling was hardly more than 800ft., but during the early afternoon the weather cleared up slightly and about 40,000 onlookers eventually found their way to Bromma airport. The afternoon was devoted to demonstrations of service as well as private aircraft, among which latter was the new Swedish-built private-owner and



Some of Sweden's Gloster Gladiators come in over a line of F. W. Stieglitz trainers.

trainer type G.V.38 launched recently by the shipbuilding firm, Aktiebolaget, Götaverken. Of particular interest was the first appearance in Sweden of the German transport, the Ago 192, or *Kurier*. Seating four passengers, the *Kurier* is a low-wing monoplane with retractable undercarriage and two 240 h.p. Argus engines, which give a cruising speed of 178 m.p.h. Chiefly destined for feeder or charter work, it may be a four-, six- or even eight-seater. Passengers are allowed to smoke and the accommodation includes a cocktail cabinet and a broadcast receiver for the entertainment of passengers. The machine is also claimed to be suitable for military purposes, either for reconnaisance or as a light bomber, and it is being used extensively in Germany for blind-flying instruction. Herr Gerd Achgelis, the famous aerobatic pilot, took the *Kurier* up from Bromma on the Monday and showed a slightly dazed party of Swedish experts a series of demonstrations that had to be seen to be believed, and even then, in some cases, remained unbelievable.

The good work started at Stockholm is being continued in the shape of smaller-scale "air weeks" to be held in the near future at all larger provincial cities that have private or military aerodromes.

Production Mission Returns from Canada

EARLY last week Mr. A. H. Self, Mr. A. C. Boddis and Mr. F. Handley Page, members of the delegation which visited Canada with a view to placing orders for bombers with Canadian firms, returned to Southampton from New York in the Cunard White Star liner *Queen Mary*.

Mr. Self said that the announcements which had already been made had indicated the result of their activities, and they returned feeling that the plans which had been formulated were based on a sound, practical foundation. He was unable to make any statement regarding the delivery date of the first of the machines covered by the orders. He added that the mission had everywhere received the assistance and co-operation which they desired.

Some further notes on Canadian production plans appear on page 257 of this issue.

High Ratings for Daimler Benz

SOME new figures for the power of the German Daimler Benz D.B.600 inverted vee-twelve engine have lately been issued. It may be recalled that this unit, which is installed in some of Germany's latest military aircraft, is of 33.9 litres capacity.

The six-throw crankshaft is mounted in lead-bronze bearings, the main rods having roller bearings, and the auxiliary rods plain bearings. There are four valves per cylinder with push-rod operation from two camshafts, these latter being driven from two vertical shafts and bevel gearings at the rear of the engine. The aluminium alloy pistons have fully floating gudgeon pins, and the compression ratio is 6.5 to 1.

The main bearings and connecting rods are accessible after the removal of a cover plate on the top of the crankcase.

Reduction gearing of either 0.55 to 1 or 0.88 to 1 is available, the airscrew turning clockwise in each case.

The medium supercharged model gives 1,050 h.p. for take-off; this is also the rated power of the fully supercharged unit at 13,120ft. The weight of the medium supercharged model is 1,200 lb., the high-altitude blower adding 45 lb. Dimensions are: Length, 67½in. without airscrew hub; width, 32in.; height, 39¼in. The engine is rated for fuel of 87 octane number.

Cambridge Inauguration

INTERNATIONAL complications permitting, the new Cambridge aerodrome, operated by Marshall's Flying School, will be opened by the Secretary of State for Air on Saturday afternoon, October 8.

Sir Kingsley Wood, it is stated, will lunch at the aerodrome with a distinguished company representing aviation, the University and the town, and afterwards there will be a small flying display, lasting about 1½ hours.

Marshall's state that they regret that it will be impossible to entertain visiting pilots to lunch, but teas will be obtainable by anybody applying for tickets by October 5. Visiting aircraft should not land between 13.30 and 16.30 hours.

Indian Government Discusses Aircraft Manufacture

AT question-time in the Central Assembly at its recent sitting in Simla (writes an Indian correspondent) the manufacture of aeroplanes from materials available in the country was referred to by Mr. Lalchand Nanvalrai.

Mr. A. G. Clow, Communications Member, stated that a general investigation into the possible use of Indian components in aircraft construction was not likely to be of value merely because some of the raw materials from which components were made were found and produced in India. The very complicated processing required for practically all materials used in aircraft construction could not at present be carried out in India.

"I might add," said Mr. Clow, "that, even so far as the basic raw materials are concerned, an enquiry into the suitability of Indian timbers for the purpose of aircraft constructions and repairs, which is in progress, is not giving promising results so far."

The member added that no aeroplanes had been constructed in India, but a small number of aeroplanes had been assembled and rebuilt there from imported manufactured parts.

"Self-sufficiency, irrespective of cost, is not an ideal to be aimed at," said Mr. Clow.

Air Defence Cadet Corps Instruction

THE Air League of the British Empire has issued a leaflet outlining the instruction that will be given to members of the new Air Defence Cadet Corps which it is sponsoring.

The instruction is designed to make youths thoroughly acquainted with aviation and thus provide a suitable nucleus from which personnel can be drawn for the Royal Air Force, civil aviation and the aircraft industry. There are nine main subjects of instruction: Drill, physical training, R.A.F. administration, airmanship, theory of flight, elementary principles of aircraft engineering and maintenance, radio operating, air navigation, and meteorology. Instruction will also be given in model aeroplane-making and flying, A.R.P. work, and subjects of general aviation interest. It is hoped that senior cadets, with their parents' consent, will be given instruction in flying.

Copies of the leaflet are obtainable from the Air League at Maxwell House, Arundel Street, London, W.C.2.

THE INDUSTRY

Our Indefatigable Air Minister

ALTHOUGH Sir Kingsley Wood's tour of the Midland shadow factories last week was interrupted by the international crisis, which necessitated a hurried return to London, he did manage to visit several plants.

Accompanied by Sir Edward T. Campbell, his Parliamentary Private Secretary, the Air Minister made the Rover factory at Tyseley his first point of call.

Thence, on his way to Coventry, he stopped on the outskirts of the city to visit the Alvis works, although it is not in the shadow scheme. Among units he saw there was the new 450 h.p. Leonides engine.

From there he went on to the Standard, Daimler and Rootes factories.

In a statement afterwards Sir Kingsley said:

"My visit to Birmingham and Coventry was devoted to factories which are busily engaged in co-operating in the aircraft engine scheme. I was glad to observe that they were producing large numbers of components for these aero engines.

"These factories are designed for two important purposes—immediate production and also to provide works and men, fully trained, who can be turned over wholly in the case of emergency."

Parnall Progress

ACCOUNTS of Parnall Aircraft, Ltd., to be presented at the annual general meeting on September 28, tell a story of almost phenomenal progress.

Launched as a public company in 1935, Parnalls suffered a loss of over £48,000 on the first year's trading. In the second year this was converted into a profit of nearly £27,000. This year's net earnings show another very substantial increase, which makes it possible to declare a first dividend of 7½ per cent.

When the old Parnall works at Yate were taken over in 1935 there was a staff of 15. Now there are nearly 3,000, with an ultra-modern plant in keeping.

Slotted Nuts in Quantities

THE manufacture of what are commonly known as A.G.S. parts has its technical problems, just as exacting as those which face the maker of larger components. One example occurs in the production of castellated nuts, and concerns the problem of maintaining accuracy in slot-cutting while manufacturing at high speed and in large quantities.

One solution has been found by a firm of A.G.S. specialists, Lisson Aircraft and Precision Engineering Co., Ltd., 103, Farnham Road, Slough. At their new works is practised an exceptionally simple method, as yet not fully covered by patents, whereby an almost unlimited number of nuts can be slotted simultaneously and with perfect accuracy. By this method, it is claimed, one operator produces nearly three times the number of nuts that can be dealt with by any other method in the same period.

Lisson Aircraft, under the directional influence of Mr. N. Tweedale and Mr. J. Raynes (not forgetting the general manager, Mr. A. C. Robins), produce nuts, bolts, washers, pins, etc., to the requirements of nearly all the leading aircraft manufacturers in the country. The company's new works is armed with batteries of the most modern automatics, capstans and lathes, which can deal with the quantity production of almost any type of nut or bolt up to 1½in. diameter and in certain cases of even greater dimensions. Finally, it is almost unnecessary to add that the company has been for many years on the A.I.D. approval list.

The Air Minister at the Alvis works. On his left is Capt. G. Smith-Clarke, director and chief engineer.

What's in a Radiator?

A MODERN Serck aircraft radiator for a 1,000 h.p. engine contains three-quarters of a mile of solid drawn tubing; weighs approximately 120 lb.; has only 1.85 sq. ft. of frontal area; and is sufficient to keep a 1,000 h.p. engine at the correct temperature.

This fact is culled from an extremely well-illustrated brochure dealing with the activities of Serck Radiators, Ltd., Greet, Birmingham, in a very wide field covering many products from aircraft and car radiators to industrial cooling equipment. It also includes details of the many special sections of tubing available from the Serck tube mills.

Mr. W. R. Barclay

FLIGHT regrets to record the death of Mr. William R. Barclay, in Birmingham, on September 16, at the age of 63. Mr Barclay was an outstanding authority on non-ferrous metallurgy. A university lecturer on metallurgy before the war, he rendered distinguished service to the Ministry of Munitions during the war period, for which he was awarded the O.B.E. At this time Mr. Barclay revived the idea of utilising electric furnaces for the melting of cupro-nickel alloys and an arrangement was made with Henry Wiggin and Co., Ltd., of Birmingham, for collaboration in the rolling of electrically melted metal.

In 1928, Mr. Barclay became managing director of the Henry Wiggin concern and in 1931 he was appointed consulting metallurgist to the Mond Nickel Co., Ltd. During his association with the Mond Nickel Co., Ltd., Mr. Barclay was largely instrumental in initiating the company's research and development organisation, as a result of which, in conjunction later with the International Nickel Co., innumerable new uses were discovered for nickel and nickel alloys.

Forthcoming Events

September 26. G.A.P.A.N.: Instructors' Conference, 6.30 p.m., 14, Thavies Inn, Holborn Circus, London, E.C.1.

September 27. R.Ae.S. Graduates and Students Section: Inaugural Address, 7, Albemarle Street, London, W.1.

October 8. Opening of new Cambridge Aerodrome by Secretary of State for Air.

October 14. Northamptonshire Aero Club: Annual Ball, Salon de Danse, Northampton.

October 15. South Coast Flying Club: Annual Dinner and Dance, Grand Hotel, Brighton.

October 20. R.Ae.S. Lecture*: "Light Alloys in Aircraft Construction," by M. le Coeuvre.

November 3. R.Ae.S. Lecture*: "The Meteorological Problem of the North Atlantic," by Capt. F. Entwistle, B.Sc.

November 9 (Wednesday). R.Ae.S. Lecture*: "American Aircraft," by T. P. Wright, F.I.Ae.S., F.R.Ae.S.

November 17. R.Ae.S. Lecture*: "The Work of the D.V.L.," by Dr. F. Seewald.

November 18. Brooklands Four-Club Annual Dinner and Dance, Grosvenor House, London.

November 18 - December 4. Paris Aero Show, with Air Transport Congress.

December 1. R.Ae.S. Lecture*: "Flying Controls," by Prof. G. T. R. Hill, M.C., M.Sc., F.R.Ae.S.

December 15. R.Ae.S. Lecture*: "Some Results from the Deutsche Forschungsanstalt für Segelflug Smoke Tunnel," by Herr A. Lippisch, A.F.R.Ae.S.

* All these Lectures take place at 6.30 p.m., at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1.

THE INDUSTRY (CONTINUED)

New Paint-spray Gun

A LEAFLET issued by B.E.N. Patents, Ltd., Gorst Road, London, N.W.10, describes their new "Varispray" paint gun. As the name implies, the spray can be changed from fan to round form, and vice-versa, without interruption of operation.

G.E.s and Pobjoys

GROUND engineers whose licences are endorsed for Pobjoy engines are asked by Pobjoy Airmotors and Aircraft, Ltd., Rochester, Kent, to forward their names and addresses for the company's register so that technical instructions may be sent to them as and when issued.

Inexpensive Welding Equipment

EXTREMELY inexpensive portable electric welders are described in a leaflet issued by Wallis-Noble, Ltd., 14-20, Regent Street, London, S.W.1. One lightweight model actually operates off an ordinary six-volt storage battery, is stated to give a 7,000 deg. arc, and costs only 35s.

For the Drawing Office

MADE by a special graphite-grinding process which gives exactly the right size and shape of grain, A. W. Faber's "Castell" pencils are claimed to be outstandingly suitable for making tracings from which blue prints are to be taken. Made in eighteen grades, they are available for every drawing-office purpose. A. W. Faber, 13-14, Camomile Street, London, E.C.3, are the makers.

T.I.G.B.'s "21st"

MESSAGES of congratulation from many prominent persons and institutions are collated in a commemorative booklet marking the coming-of-age of the Technological Institute of Great Britain. Copies of the souvenir, together with the prospectus, *The Engineer's Guide to Success* (containing particulars of over two hundred correspondence courses in engineering and technical subjects), are obtainable on application to the T.I.G.B. at Temple Bar House, London, E.C.4.

V.D.M. Airscrews and Spinners

CONSTANT SPEED AIRSCREWS, LTD., of Warwick, for the information of those interested, wish to make public the following letter received by them from Vereinigte Deutsche Metallwerke A.-G. :—"We . . . take pleasure in confirming that, according to the existing licence contract of the third of February, 1937, concluded between you and our company, you are the sole and exclusive owner of our licence to manufacture, make, use, exercise and vend our V.D.M. v.p. airscrews as well as V.D.M. spinners for airscrews in the whole territory of the British Empire, including the Dominions."

The Latest Magnaflux

IN a number of aircraft and engine factories the Magnaflux crack detectors, made by the Equipment and Engineering Co., Ltd., 2-3, Norfolk Street, Strand, London, W.C.2, are in use for testing purposes. Now the makers have introduced a new model, known as the Duplex type and specially intended for production testing for cracks in two directions.

This equipment, it is stated, is particularly suitable for finding both transverse and longitudinal cracks in parts of irregular cross-section. The test is accomplished by magnetising with a first circuit in one direction and then with a second circuit at right angles to the first. In order to test for longitudinal flaws down the whole length of a part, the part is moved through the other magnetic field complete with the pole limbs on which it rests.

Speed on Land

A GREAT many components of the Rolls-Royce engined car, *Thunderbolt*, with which Capt. G. E. T. Eyston recaptured the world's land speed record at 357 m.p.h. last week are the work of firms well known in the aircraft industry.

Among them may be mentioned: B.T.-H. magnetos; Lodge plugs; Smith's instruments; Lockheed brakes; Dunlop wheels and tyres; Accles and Pollock steel tubing; castings and forgings by High Duty Alloys, Ltd., Birmingham Aluminium Casting Co., English Steel Corporation and Thomas Firth and John Brown, Ltd.; radiator, bodywork and tanks by John Marston, Ltd.; Petroflex tubing; Simmonds controls and stop nuts; B.P. Ethyl fuel was used, and Castrol oil; and Capt. Eyston wore Meyrowitz goggles.

Welding Problems Discussed

VARIOUS problems connected with welding, together with numerous hints and suggestions, are discussed in a bright and breezy manner in *Sif-Tips*, a handy pocket journal published quarterly by the Suffolk Iron Foundry (1920), Ltd., Sif-bronze Works, Stowmarket, Suffolk.

"The Intava World"

"FUELS for high-output engines" is the subject of the principal article in the first number of *The Intava World*, published by Intava, Ltd., the concern which, it will be remembered, now watches the aviation interests of the Anglo-American Oil Co. and the Vacuum Oil Co.

This new periodical, which is finely illustrated, deals with technical and semi-technical aviation subjects. It is circulated privately from the Intava offices at 50, Queen Anne's Gate, London, S.W.1.

Heavy Work on Light Alloys

REYNOLDS TUBE CO., LTD., announce further big extensions to their plant as a result of still heavier demands for light alloy tubes and sections. New plant includes a 5,600-ton extrusion press, said to be the largest in the world, together with a further 2,750-ton press. The large press will produce sections weighing three-quarters of a ton and up to 60ft. in length in heat-treatable high-strength alloys. Work is well advanced and the new units are expected to be in operation by the end of this year.

These additions, it is claimed, will make the Reynolds works the largest in the country devoted solely to the production of light alloy sections and tubes.

PUBLICATIONS RECEIVED

Airplane Servicing Manual, by Lt.-Col. V. W. Pagé; 25s., Sir Isaac Pitman and Sons, Ltd., Parker Street, Kingsway, London, W.C.2.

Old Coaching Days: A Souvenir of the White Horse Cellar, Piccadilly, W. Hatchett's Restaurant, Piccadilly, London, W.1.

Rolls-Royce "Merlin" Engine; catalogue. Rolls-Royce, Ltd., 14-15, Conduit Street, London, W.1.

Gipsy Twelve Aero Engine catalogue; De Havilland Aircraft Co., Ltd., Hatfield Aerodrome, Herts.

Robert Loraine: Actor, Soldier, Airman, by Winifred Loraine; 10s. 6d., Collins, 48, Pall Mall, London, S.W.1.

Hell in the Heavens, by A. G. J. Whithouse; 6s., W. and R. Chambers, Ltd., 11, Thistle Street, Edinburgh.

Hughes' Tables for Sea and Air Navigation, by L. J. Comrie; Henry Hughes and Son, Ltd., 59, Fenchurch Street, London, E.C.3.

The Yorkshire Gliding Club Secretary's Report for year ended July 31, 1938. Yorkshire Gliding Club, Sutton Bank, Nr. Thirsk, Yorkshire.

Skyways, by C. G. Hall; 6s., Macmillan and Co., Ltd., St. Martin's Street, London, W.C.2.

Aerodromes: Their Location, Operation and Design; 10s. 6d., Sir Isaac Pitman and Sons, Ltd., Parker Street, Kingsway, London, W.C.2.

Teach Yourself to Fly, by Nigel Tangye; 2s., The English Universities Press, Warwick Square, London, E.C.4.

NEW COMPANY

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

H. H. MARTYN (AIRCRAFT), LTD.—Private company, registered September 10. Capital, £100 in 100 ordinary shares of £1 each. Objects: To carry on the business of dealers in and manufacturers and repairers of flying machines of all kinds. The directors are: Charles C. Regnart, Pinner Court, Pinner, company director; Harry S. Wharton, 145, Tottenham Court Road, London, W.

INCREASE OF CAPITAL

DEVANEY PATENTS, LTD. (Builders of aeroplane and other internal combustion engines, etc., Dashwood House, 69, Old Broad Street, London, E.C.2).—The capital has been increased by the addition of £1,900 beyond the registered capital of £600. The additional capital has been divided into 7,600 ordinary shares of 5s. each.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(*Published September 22*, 1938).

35458. LINDE AIR PRODUCTS CO.: Volatile welding and brazing fluxes (491,008).

4321. MARENDAZ, D. M. K.: Aircraft flaps (490,850).

5412. STANDARD TELEPHONES AND CABLES, LTD., and EARP, C. W.: Radio direction-finding apparatus (490,940).

5902. JABLONSKY, B.: Hub fixing or adapter for and blades of variable or adjustable-pitch airscrews (491,155).

6492. MERCIER, J.: Jointed mechanisms for aircraft (491,094).

14330. FAIREY AVIATION CO., LTD., LOBELLE, M. J. O., and TROTTER, J. C.: Folding-wing aircraft (490,964).

14390. FAIREY AVIATION CO., LTD., FORSYTH, A. G., and PERT, G. J. SMITH: Means for varying the pitch of propeller blades, especially aircraft propeller blades (491,041).

29664. TELEFUNKEN GES. FUR DRAHTLOSE TELEGRAPHIE: Radio-direction-finders (491,127).

30383. LORENZ AKT.-GES., C.: Arrangements for supervising the operation of wireless antenna structures (491,129).

35501. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Control of the delivery of fuel-injection pumps in internal-combustion engines of the injection type (490,989).

35685. LORENZ AKT.-GES., C.: Arrangements for modulating high-frequency oscillations (490,990).

8393. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Tanks for containing liquids (491,205).